COLORADO MESA UNIVERSITY

FOURTH ANNUAL

STUDENT SHOWCASE

2013

SHOWCASE PROCEEDINGS

Friday, April 26, 2013

coloradomesa.edu/showcase

About the Student Showcase

The Student Showcase highlights student works involving creativity, discovery, research, innovation, and/or entrepreneurship through sessions by undergraduates at Colorado Mesa University and Western Colorado Community College. The Student Showcase builds on classroom experience and is a venue where students can share their work with faculty, student peers, and community members. Students participating in this campus-wide forum have distinguished themselves as scholars. The sessions' abstracts are published in this *Showcase Proceedings*.

Student Showcase Planning Committee

Andres Aslan
Physical and Environmental Sciences

Jessie Barnett
Academic Affairs

Scott Bevill
Mechanical Engineering

Blake Bickham
Teacher Education

Julie Bruch
Languages, Literature and Mass Communication

Adele Cummings
Social and Behavioral Sciences

Carol Futhey
Academic Affairs

Suzie Garner
Art

Philip Gustafson
Computer Science, Mathematics and Statistics

Kristin Huemann
Kinesiology

Darin Kamstra
Music

Cindy Lueb
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Health Sciences

Bill McCracken
Manufacturing and Industrial Services, Western Colorado Community College

Deborah Parman
Business

Timothy Pinnow
Theatre

Steve Werman
Academic Affairs; Biological Sciences

Student Showcase Proceedings

Friday, April 26, 2013
Grand Junction, Colorado

Colorado Mesa University

Western Colorado Community College
A Division of Colorado Mesa University

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Scott Kessler
Mechanical Engineering

Saileza Khatiwada
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Social & Behavioral Sciences

Barry Laga
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Suzanne Lay
Business

Gig Leadbetter
Kinesiology

Justin Liles
Social & Behavioral Sciences

Richard Livaccari
Physical & Environmental Sciences

Susan Longest
Biological Sciences

Beverly Lyne
Health Sciences

Warren MacEvoy
Computer Science, Mathematics & Statistics

Showcase Sponsors (continued)

Britt Mathwich
Business

William McCracken
Manufacturing and Industrial Services,
Western Colorado Community College

Charles McLeod
Languages, Literature & Mass Communication

Nathan McNeill
Colorado Mesa University and University of Colorado
Mechanical Engineering Partnership Program

Kyle McQuade
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Chad Middleton
Physical & Environmental Sciences

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Gigi Richard
Physical & Environmental Sciences

Joe Richards
Physical & Environmental Sciences

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Business

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Johnny Snyder
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Stephen Stern
Biological Sciences

Genell Stites
Health Sciences

Sarah Swedberg
Social & Behavioral Sciences

Farzad Taghaddosi
Mechanical Engineering

Bill Tiernan
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Languages, Literature & Mass Communication

Thomas Walla
Biological Sciences

David Weinberg
Physical & Environmental Sciences

Jared Workman
Physical & Environmental Sciences

Showcase Participants

Showcase Participants Continued

Showcase Participants Continued

Showcase Participants Continued

ABSTRACTS

Presenter(s)-Major: **Kacey Abbott - Culinary Arts, Bonnie Davis - Culinary Arts, Travis James - Culinary Arts, Haley MacDonald - Culinary Arts, Joseph Shero - Culinary Arts**
Title: AMERICAN CULINARY FEDERATION ARTISTIC FOOD DISPLAYS
Department: Western Colorado Community College
Sponsor: Jon St. Peter

Abstract: The presentation will reflect the following skills: proper cooking techniques, advanced knife skills, varied food preparation techniques, creativity, glazing with aspic, proper plating techniques, and menu presentations. The observer should be able to identify and distinguish variations in cooking techniques, types of food, sensibility of flavor combinations, color, texture, height, and shape, as well as the use of line, form, balance, flow, and symmetry involved in presentation. Displays will include one five course gastronomique menu, one five course vegetarian gastronomique menu, six different individual hot or cold desserts, six different hot appetizers, and one cold buffet platter for eight. All displays will be shown cold.

Presenter(s)-Major: **Jaimie Abert - Business Admin-Hospitality Management, Amanda Bowen - Pre-Business Administration, Jeffrey Sederlin - Exercise Science**
Title: UNDERWATER RESORT CASINO
Department: Business
Sponsor: Britt Mathwich

Abstract: Welcome to Morwenna, the only underwater resort casino. Built in the heart of Hamilton Island, Australia, the goal is to boost the economy and create jobs. Morwenna will have a hotel with 177 rooms, 9 villas and a unique underwater dome that will house a large casino, bars, night clubs, high-end retail shops, fine dining, and a kids' FunPlex. The FunPlex will offer a day care service, mini golf, arcade, laser tag, and several other kid-friendly activities. The target market is upper middle class citizens worldwide. The first marketing efforts will focus on the United States and Australia. There are other resorts on this small island; however, none have a casino, or boast the size and quality of Morwenna. The speakers will be presenting their research on the resort concept, resort offerings, and space design. The presentation will include a power point presentation and will have visual aids for the physical location and the building design. The intended audience for this project is anyone who would be interested in staying at this resort.

Presenter(s)-Major: **Lynn Albers - Liberal Arts**
Title: THE HISTORICAL ETHNOBOTANY OF *CELTIS RETICULATA* (NETLEAF HACKBERRY)
Department: Social & Behavioral Sciences
Sponsor: Steven Schulte and Margot Becktell

Abstract: Historical ethnobotany, which can be succinctly described as the study of inter-relationships of people and plants chronicled over an expanse of time, can also serve as a tool for understanding ourselves and our world. *Celtis reticulata* (netleaf hackberry) is a western North American native plant whose historical, cultural, and biogeographical significance is underappreciated. Due to its underappreciated status, *Celtis reticulata* has also been infrequently studied and therefore is poorly understood. Grounded in ecological and taxonomic studies, a creative literature review was undertaken in this investigation of *Celtis reticulata*, alongside discussions with professional archeologists and Ute ethnohistorians. *Celtis reticulata* offers an insight into how plants have helped shape American and world history. As a crucial cog in the ecological balance and human geography of the Intermountain West, *Celtis reticulata* has also served as an integral food and cultural resource for North American indigenous peoples. As an interdisciplinary field of study, historical ethnobotany helps delineate the role of lesser known botanical species, such as *Celtis reticulata*, in the landscape of the arid West – in addition to identifying the prominence of plants in our world community.

Presenter(s)-Major: **James Albertson - Exercise Science, Mychal Beauchamp - Exercise Science, Joel Schnierle - Kinesiology-Exercise Science**
Title: CALORIC OUTPUT BETWEEN HIGH INTENSITY INTERVAL TRAINING AND STEADY STATE TRAINING
Department: Kinesiology
Sponsor: Brent Alumbaugh

Abstract: The purpose of the study was to determine the results of interval training versus steady state training in regards to caloric expenditure post exercise. Four moderately active males had their baseline fitness measured by performing a VO2 max. After this, each male performed an interval training test. The test consisted of the individual sprinting at 8 MPH for 1 minute followed by walking at 2 MPH on a treadmill for a total of 16 minutes. Oxygen consumption was then measured for 20 minutes following the test to ensure that the individual got back to their resting state. On a separate day, the steady state training test was performed which consisted of running on the treadmill for 16 minutes at 65% of the individual's VO2 max. Oxygen consumption was again measured for 20 minutes following the exercise. Individuals burned 31% of their total caloric expenditure in the 20 minutes following the interval training compared to just 18% following the steady state training. This information can be used to help individuals more successfully achieve desired fat loss through interval training.

Presenter(s)-Major: **Caitlin Anderson - Hospitality Management, Katie Dunn - Pre-Business Administration, Kourtney Richards - Business Administration**
Title: THE LOST LAKE RESORT DEVELOPMENT PLAN
Department: Business
Sponsor: Britt Mathwich

Abstract: To help promote tourism in Mid-Western Colorado, a group of three students designed a preliminary plan to develop "The Lost Lake Resort" located near Gunnison, Colorado. This presentation will cover three phases of the six phase resort development plan from the Hospitality Management 450 capstone project. The first phase is the resort concept with a brief introduction to the target market, competitors, and resort theme. Next, the presenters will explain resort offerings such as accommodations and recreational facilities. Finally, the space design consisting of the resort layout and additional considerations will be discussed in detail. With the assistance of hospitality management investors as well as the community, this resort will help boost the local economy by introducing jobs and revenue while maintaining an eco-friendly environment.

Presenter(s)-Major: **Joel Anderson - Computer Information Systems**
Title: SOPA, PIPA, AND THE THREAT TO INTERNET NEUTRALITY
Department: Business
Sponsor: Johnny Snyder

Abstract: Many people throughout the world connect and use the Internet every day for work, social networking, or entertainment. The Internet provides a gateway to large amounts of data and contact with other people. Most countries are open to the Internet, but several nations have limited or blocked access for their residents. Other nations have tried to implement laws which would have restricted content on the Internet, such as SOPA and PIPA in the United States. This paper focuses on what the effects of such laws could have been, by analyzing professional critiques and recommendations from public policy councils. This paper also examines claims made by the Motion Picture Association of America and the Recording Industry Association of America about the threats of an unregulated Internet. These claims provide insight into the reasoning behind SOPA and PIPA, and the goals and risks associated with them. Without increased knowledge of the risks of government regulation on the Internet, more threats to Internet neutrality will continue to arrive in new legislation.

Presenter(s)-Major: **Colton Arendt - General Engineering, Shane Burdi - Pre-Engineering, James Nimtz - General Engineering, Austin Stewart - General Engineering**
Title: R. R. MOORE FATIGUE TESTER
Department: Mechanical Engineering
Sponsor: Scott Kessler

Abstract: Materials undergo many stresses and strains under normal use. It is important to have an idea of when these materials will fail so that injury and great financial loss

may be averted. A way that the fatigue of a material may be accelerated is the R. R. Moore style fatigue tester. The purpose of the tester is to accelerate the fatigue that a material will experience over its lifetime to determine when a material will fail. This is done by rotating a specimen at a high velocity while applying a constant weight to deform (fail) the specimen.

Presenter(s)-Major: **Shawna Armstrong - Computer Science, Cody Cline - Computer Science, Treyce Fenske - Computer Science, Mark Liedtke - Computer Science**
Title: THE BORED ROOM
Department: Computer Science, Mathematics & Statistics
Sponsor: Lori Payne

Abstract: How many times have you sat in a class and been given homework and darn, you didn't bring your planner? This simple Delphi application will be a great addition for anyone wanting to have all of their information from class or a meeting at their fingertips. This program will have three different sections. The first will contain a contact page where the user will be able to save his or her professor's information so it can be accessed if needed. The second section will have a note-taking page where a user can save notes that will also include a calendar to see if there is anything else due on a particular day. With the third section being a little more fun related with an adventure game that allows the user to escape if things become a little "boring."

Presenter(s)-Major: **Krista Arndt - Nursing, Dusty Curtis - Nursing, Ruth Gamboa - Nursing, Anabel Meraz - Nursing**
Title: ART THERAPY IN THE HOSPITALIZED PEDIATRIC ONCOLOGY PATIENT
Department: Health Sciences
Sponsor: Beverly Lyne

Abstract: The cascade of emotions that accompanies a diagnosis of cancer is often difficult to portray in words, especially for pediatric patients. Art therapy is a way to express developing emotions and provide relaxation through drawing, painting, dancing, etc. The objectives of this study are to encourage self-expression and increase relaxation in the hospitalized pediatric oncology patient. A sample size of 40 participants was determined for this study with an expected attrition rate of 10 participants. The samples will be randomly selected males and females between the ages of 8 and 12. These individuals must have the ability to fluently speak English. There must be a cancer diagnosis and they must be admitted as an inpatient and be undergoing a form of cancer treatment. The purpose of this phenomenological, qualitative research study is to encourage self-expression and increase relaxation in hospitalized pediatric oncology patients using drawing as a form of art therapy.

Presenter(s)-Major: **Ryan Ashley - Pre-Engineering, Christopher Buck - Pre-Engineering, Jonathon Stelling - General Engineering, Robert VanRoosendaal - General Engineering, Tyler Woodman - Pre-Engineering**
Title: OFF ROAD WHEELCHAIR
Department: Mechanical Engineering
Sponsor: Scott Kessler

Abstract: Most wheelchairs are easily used on smooth surfaces such as sidewalks. The purpose of this project is to design a wheelchair that can be maneuvered on rough terrain. The wheelchair was designed to be propelled using a crank system that will allow the user to move over obstacles that normal wheelchairs are not able to negotiate. The team of designers will show the functionality of this wheelchair, which could prove an avenue to outdoor recreation for people with disabilities.

Presenter(s)-Major: **Donovan Asselin - Computer Science, Cody Herrick - Computer Science, Robert VanMatre - Computer Science**
Title: DRC GAMES
Department: Computer Science, Mathematics & Statistics
Sponsor: Lori Payne

Abstract: Many people, when they first start to play video games, run into complicated material that may be hard for them to understand such as menu screens, rules, and game

design. DRC Games is a gaming application built for easy user interaction and seamless gameplay that anyone can enjoy. This project assures that users will be able to hop right into DRC Games and be able to start experiencing fun game play right off the bat. Using clear easy instructions, a well-designed layout, and eye-catching graphics, DRC Games will simulate a stress free environment and a memorable experience. DRC Games is built of multiple, very simple games that allow for any first time or experienced user to play them without error, difficulty, or frustration. To tie in the user experience in this project, there is also a gamer profile, which shows user stats, experience, and progress throughout each individual game as well as all of the games combined. Skills and lessons taught in user interface and design are used to create a seamless, well-organized layout with a large sense of program security to create a unique user involvement within the program.

Presenter(s)-Major: **Franklin Atkinson - Liberal Arts, Humanities**
Title: CLUTTER: A READING OF NEW WORK
Department: Languages, Literature & Mass Communication
Sponsor: Charles McLeod

Abstract: Over the centuries, poetry has been a commanding medium for expressing powerful emotions, making political statements, and making observations of the worlds around us. This project will be the reading of a selection of poems, written by the presenter, that examine the human condition. These poems, written during the Spring 2013 semester, use various forms and styles including haiku as well as unpatterned and unrhymed verse. The themes will range across the powerful emotions of loss and waste, discuss our political situation, examine the futility of our desire for electronic connection with others, and use controlling metaphors to add additional meaning to the narrative found in the poems.

Presenter(s)-Major: **Felicia Avila - Pre-Nurse Allied Health, Katherine Davis - Nursing, Sara Gatt - Nursing, Ashley Thompson - Nursing**
Title: TEAMWORK AND COLLABORATION
Department: Health Sciences
Sponsor: Genell Stites

Abstract: In nursing, "Teamwork and Collaboration" is an everyday tool. "Teamwork and Collaboration" does not need to be made into a big task in itself; it is something simple that is carried out by every member of the health care team. The nurses are constantly communicating and collaborating with the doctors about the patient's status, orders, and care. Nurses communicate and collaborate with the nursing assistants, technicians, and/or clerks they are working with to manage the delegated tasks, help with assessments, and manage orders, and also with the overall care of the patient. Nurses also communicate and collaborate with other nurses to share experience and skills. Communication between nurses is also a way to make sure the patients have the correct care. If the attending nurse is busy with another patient, then another nurse can assist the patient in need. "Teamwork and Collaboration" are vital to the health care team to carry out competent, caring, and consistent care for the patient. Most of the time, it is just an automatic tool that is utilized by nursing staff, but when teamwork and collaboration break down within the health care team, everyone notices and is affected. Without proper teamwork and collaboration from all members of the health care team, the team is not happy and the patient may be in danger. The presenters will discuss how communication is the biggest cause of sentinel events according to the Joint Commission. "Team work and Collaboration" is vital to the safety of the patient.

Presenter(s)-Major: **Natalie Bagnard - Mechanical Engineering Tech, Jeremy Jenkins - Pre-Engineering, Christian Ramos - Pre-Engineering, Zachary Reeves - Pre-Engineering, Aaron Troxel - Mechanical Engineering Tech**
Title: SHOOT THE MONKEY
Department: Mechanical Engineering
Sponsor: Scott Bevill

Abstract: The purpose if this project is to demonstrate the concept of projectile motion by shooting a toy monkey with a projectile. This project will demonstrate that the acceleration of gravity is constant for both the projectile, which is fired at an angle, and for the monkey, which drops vertically. Since both the projectile and the monkey fall at the same rate, the result is that the projectile hit the monkey every time. What if the projectile is fired with a low initial speed? Would there be a need to compensate where the projectile is aimed? The answer is no—come discover why!

Presenter(s)-Major: **Brandon Baker - Computer Information Systems, Derek Dodson - Computer Information Systems**
Title: EXPENDITURE MANAGEMENT: A SMALL-SCALE BILLING MANAGEMENT SYSTEM
Department: Business
Sponsor: Gayla Jo Slauson

Abstract: The presenters created a database to manage and maintain the record of past, present, and future bills, either on an individual basis or for the bill management of a business. The design of this database was motivated by the need to provide a more viable solution for storing, retrieving, and archiving bills and associated utility consumption pattern for monitoring reoccurring expenditures. Limited background information is required to understand the application and use of such a database although a basic understanding of database design is useful. This project is best summarized as a business software solution to expenditure management. The presenters will share a completed database which will have the ability to retrieve, modify, and input records. This database will also be able to print reports containing needed records information in a summarized fashion. This project could create a smaller scale solution for individuals and businesses that need to migrate from traditional document management in paper form to a digital format to better monitor recurring costs and general expenditures.

Presenter(s)-Major: **Samantha Banker - Liberal Arts, Elem Teaching, Jennifer Hopkins - Liberal Arts, Elem Teaching**
Title: CHANGING CHOCOLATE
Department: Teacher Education
Sponsor: Jennifer Daniels

Abstract: This project was to evaluate a science experiment based upon the STEM (Science, Technology, Engineering and Mathematics) model by a group of two elementary teacher candidates. The two students had created an experiment that would be easily administered in a regular classroom during a chemistry unit in an elementary classroom. The purpose of the project was to go through the STEM model for this experiment to see how the STEM model steps would lead elementary students on a guided scientific process. The presenters will share how to define what a chemical and physical change is with the familiar substance of candy chocolate making. Along the way the participants in the experiment made observations of two different ingredients to make the candy and then analyzed how each step made a chemical or physical change to each ingredient. Not all of the same processes lead to a chemical or physical change which is demonstrated through the STEM model, and elementary students could come to this same conclusion and discuss with peers as well.

Presenter(s)-Major: **Kenneth Banning - Pre-Engineering, Nicholas Edwards - General Engineering, Nicholas Fischer - General Engineering, Cameron Morley - General Engineering**
Title: IZOD TESTER
Department: Mechanical Engineering
Sponsor: Scott Kessler

Abstract: The IZOD impact tester is used to test the impact strengths of plastics. A striker hits the plastic and continues to swing like a pendulum. The final height of the pendulum shows the energy lost in the collision, which is related to the impact strength of the plastic. The IZOD tester was built to ASTM standards. Sample plastics made from a 3-D printer are tested after being built in all directions at different temperatures, as the strengths of each vary.

Presenter(s)-Major: **Garrett Barber - Construction Management, Richard Lehe - Construction Management, James Martinez - Construction Management, Brandon Masden - Construction Management, Samuel Meeks - Construction Management, Jorge Ochoa - Construction Management, Michael Potter - Construction Management, Francisco Retana-Quintana - Construction Management, Brody Saindon - Construction Management, Shane Seuschek - Construction Management, Tucker Shear - Construction Management, Daniel Smith - Construction Management, Gregory Walker - Construction Management**
Title: SUSTAINABLE CAMPUS WALKWAYS
Department: Business
Sponsor: Kelly Bevill

Abstract: In order to alleviate traffic and pedestrian-related accidents, a group of students in the Construction Management program designed and analyzed a project which involved the construction of multiple sustainable pedestrian walkways on 12th Street near the Colorado Mesa University campus. Although the existing crosswalks along 12th Street have become more visible, many still consider the crossings dangerous. A logical plan for the design and construction of the project, including a detailed feasibility analysis, is presented here. The proposal emphasizes the economic and environmental aspects of sustainable pedestrian bridges intended to reduce accidents as well as improve traffic flow on 12th Street.

Presenter(s)-Major: **Mark Barnes - Business Admin-Finance, Stephen Douma - Business Admin-Finance, Trevor Stapp - Business Admin-Finance, Shandra Thrams - Business Admin-Finance**
Title: A FINANCIAL ANALYSIS OF THE TECHNOLOGY INDUSTRY
Department: Business
Sponsor: Morgan Bridge

Abstract: This presentation will provide an overview of the financial health of key companies within the technology industry, including Intel, Apple, Samsung, and Amazon. A comparison of the cash flow, leverage and required financing for the companies will be discussed in detail.

Presenter(s)-Major: **Crystal Bartelt - Accounting-Public Accounting, Jessica Erven - Accounting-Public Accounting, Mesa Rangel - General Accounting**
Title: IRS REWARDS FOR WHISTLEBLOWERS
Department: Business
Sponsor: Suzanne Lay

Abstract: A group of three students researched the IRS whistle blowing program and will discuss the ethical issues involved. A whistleblower is someone who tells the public or someone in authority about a dishonest or illegal act that has taken place within a company or department. The IRS Whistle Blower Program was created in 2006 and currently offers up to 30% of the money the IRS receives from tax frauds to the whistleblower as a reward. Several people have collected millions of dollars in rewards. Most of these people were involved in these fraudulent acts themselves. This discussion will review several cases where such actions have taken place. Information will be provided on the laws and guidelines of the program. The presenters will discuss several different professional opinions as to whether or not these rewards are considered ethical.

Presenter(s)-Major: **John Bauer - Pre-Business Administration, Mitchell Castillo - Pre-Business Administration**
Title: DATABASE FOR ORDERING/ RECORD-KEEPING OF AN E-COMMERCE CONVENIENCE STORE
Department: Business
Sponsor: Gayla Jo Slauson

Abstract: This presentation is centered around a recently constructed database. The purpose of the database is to generate records, store inventory, and order data for an e-commerce convenience store. The database will encompass both the sales and ordering sides of this operation, allowing for quick review of sales trends and inventory.

Presenter(s)-Major: **Cody Baxter - Pre-Engineering, Justin Edmonds - Pre-Engineering, Nathan Hawley - General Engineering, Thomas Nielson - Pre-Engineering, Patrick Sweeney - Mathematics-Statistics**
Title: USING THE VENTURI EFFECT TO CHANGE AIR VELOCITY AND TEMPERATURE
Department: Mechanical Engineering
Sponsor: Scott Bevill

Abstract: Simply using PVC piping, ABS plastic and an air compressor, a device known as a vacuum canon is capable of generating powerful blasts of very cold air at a high velocity. This experiment utilizes air flowing through a Venturi tube and a vacuum to produce a cooling effect. Briefly, the increase in the air's kinetic energy as it passes through the constricted portion of the tube is offset by a loss of thermal energy, resulting in a decrease in temperature. This model can be the starting point for design applications such as refrigeration. The designers will demonstrate the functionality of the vacuum canon by measuring the difference between the inlet temperature and velocity versus the outlet temperature and velocity.

Presenter(s)-Major: **Christopher Beamon - Pre-Engineering, Andrew Bristol - General Engineering, Keegan Kaiser - Pre-Engineering, Addison Litton - General Engineering, Nicole Valencia-Zimmerman - Pre-Engineering**
Title: MAGNETOHYDRODYNAMIC PROPULSION
Department: Mechanical Engineering
Sponsor: Scott Bevill

Abstract: It has been estimated that Americans consume nearly 400 million gallons of gasoline daily through the use of internal combustion engines. The purpose of this project was to demonstrate movement of a small scale boat in an ionic solution using magnetohydrodynamic (MHD) propulsion, an alternative to the internal combustion engine in certain applications. The concept of MHD is that magnetic fields can induce currents in a moving conductive fluid, which in turn creates forces on the fluid and also changes the magnetic field itself. The Lorentz Force Law can be used to describe the effects of a charged particle moving in a constant magnetic field. If a particle of charge moves with velocity in the presence of an electric field and the magnetic field, then it will experience a force in the direction perpendicular the fields due to the vector cross product of the charge, velocity, and magnetic field resulting in propulsion forward. The toy boat created was an innovative design that used strong magnets, salt water, and two charged plates. The designers will demonstrate the functionality of MHD used as alternative propulsion devices.

Presenter(s)-Major: **Brandon Bearden - Computer Science**
Title: ONE TREE, TWO TREE, RED TREE, BLUE TREE
Department: Computer Science, Mathematics & Statistics
Sponsor: Karl Castleton

Abstract: Do trees have thumbprints just like humans? To investigate this question, leaf samples were taken from many trees and scanned. Key points of the veins of each leaf were mapped and analyzed using statistics to create distributions for each leaf specimen and species. We know that the leaves of two different species look similar. Are they mathematically different? What about two specimens of the same tree? Come to this talk to find out all the answers!

Presenter(s)-Major: **Steven Beaulieu - Mechanical Engineering, Skyler Ogden - Mechanical Engineering, Jeffrey Pike - Mechanical Engineering, Conrad Sweat - Mechanical Engineering**
Title: GENERATING POWER USING AN AUTOMOTIVE TURBOCHARGER
Department: Mechanical Engineering
Sponsor: Nathan McNeill

Abstract: Mechanical Engineering students from the CU-CMU partnership program created gas turbine engines in order to analyze and understand a power generation cycle. Gas turbines use heat created from combusting gases to generate power. Gas power systems can be simplified to four components: A compressor to increase the pressure, a combustion chamber to input heat, a turbine to extract work from the heat, and a heat exchanger to release excess heat before the process re-starts at the

compressor. An automotive turbocharger was used to fulfill the role of both turbine and compressor. Propane was used as the combusting gas to create heat. The goal of the project was to build a working turbine capable of generating net work, seen as self-sustaining motion of the turbine. The combustion chamber, piping system, oil supply system, and electrical systems were built onto a portable cart. Pressure and temperature data were obtained at several points in the cycle under a variety of operating conditions. The data were analyzed and compared to a theoretical power cycle to approximate the power generated. A through statistical analysis was also performed.

Presenter(s)-Major: **Justine Benedict - Art-Education, Wendy Cameron - Studio Art, Andrew Eckerling - Art, Pre-Teacher Education, Mary Gerlock - Liberal Arts, Leslye Janes - Studio Art, Ethan Johnson - Art-Education, Vallerie Kunz - Studio Art, James Raymond - Studio Art, Richard Seward - Pre-Business Administration**
Title: HANDCRAFTED CERAMICS COMPANY
Department: Art
Sponsor: Jake Allee

Abstract: Modern art calls for more from its students than ever before. The quest to perfect a given craft, without basic knowledge of business to accompany the passion, inspiration, and dedication, apparent in all art forms, is surely not enough. Ill-prepared graduates face this issue in post-collegiate life. Having knowledge about the components and purpose of a business plan, in an artistic context, before entering the market place, aids in the comprehension of specifically what is required to begin a small business. Overhead costs must be assessed, locations chosen, customer base's identified and targeted, and then the product must be marketed effectively. The modern artist must therefore adopt a business mindset before exploring creativity. The increasing popularity of Japanese food in American culture indicates great opportunity to seize a unique market niche: a handmade ceramics company that caters to Japanese cuisine. This avenue is used to demonstrate the proper, and completely necessary, convergence of modern art and the free market world in which it exists.

Presenter(s)-Major: **Tammie Binkley - Nursing, Catherine Bobbitt - Nursing, Jessie Chavez - Pre-Nurse Allied Health, Jennifer Farmer - Nursing**
Title: IT TAKES A VILLAGE
Department: Health Sciences
Sponsor: Genell Stites

Abstract: Learning how to get results collaboratively is a critical aspect of professional competence. Providing collaborative care and the application of principles of chronic disease management to renal patients will streamline and improve the care delivery process leading to improved quality of care. Patients need to learn about inter-professional collaboration in health care and human services professions in order to effectively decide what lifestyle brought them to their renal diagnosis. Utilizing a framework to form the basis for inter-professional collaboration which focuses on teaching strategies to increase awareness and improve outcomes as a goal for end stage renal patients. Essential elements of inter-professional teamwork are discussed and integrated beginning with the Physician/Emergency Department visit followed all the way through to the home care and/or facility care visit. Utilizing models for collaboration, processes of inter-professional teamwork, and nutritional goals and methodologies of each care setting will assist family, nurses, clergy, social workers, physicians, and other health and human service professionals to become effective caregivers. Increasing collaboration between professionals has been widely used in health and social care in the belief that it improves collaboration in practice for patient care.

Presenter(s)-Major: **Sean Bizer - General Engineering, Stephen Cochran - Mechanical Engineering Tech, Dane Dulaney - Pre-Engineering, Morgan Patton - Mechanical Engineering Tech, Morgan Ryan - Pre-Engineering**
Title: THE SINE WAVE DEMONSTRATED BY A KINETIC WAVE SCULPTURE
Department: Mechanical Engineering
Sponsor: Ruth Powell

Abstract: The sine wave is a fundamental equation in calculus, trigonometry, and engineering. The kinetic wave sculpture created for this project shows a physical representation of the sine wave. The purpose of this project was to demonstrate the flow of

the sine wave with a kinetic sculpture. The sculpture consisted of the square wooden grid, which is the wave, hung by fishing wire and shifted up and down by a set of pulleys and rotating disks. The wave was designed to be adjustable to show different variations of the sine wave. The kinetic wave sculpture demonstrates the flow of the sine wave, showing the wave's period and amplitude, through a visually-engaging engineering design.

Presenter(s)-Major: **Stacy Bjerk - Geology, Environmental**
Title: TRACKWAYS OF GATEWAY COLORADO: DINOSAUR WATERING HOLE?
Department: Physical & Environmental Sciences
Sponsor: Andres Aslan

Abstract: 2.5 miles northwest of Gateway, Colorado, lays a large sandstone boulder containing numerous theropod dinosaur prints. These are similar to prints found in northern Virginia, and could represent the ichnotaxa *Grallator* in origin. If true, this suggests that the trackway is late Triassic to early Jurassic in age. Given this approximate age and uniform sandstone texture of the boulder, it is likely that the trackway is part of the Jurassic Wingate Formation. The Gateway trackway displays prints which range from 8.5 cm to 16 cm in length. Based on estimates of the animal's stride, the dinosaur responsible for the larger tracks had a hip height of .64 m. Stride estimates also indicate that the stride velocity was 9.2 mph. These tracks are located near a set of ~10 cm long tracks of what appear to be the same species. Parallel tracks may represent predation, sexual dimorphism, or gregarious behavior within the species. The tracks are also located along the border of sinuous asymmetrical ripple marks which may be eolian, or hydrologic in nature. The presence of footprints however suggests a moistened substrate. This may suggest a watering hole within the harsh conditions of the late Triassic/early Jurassic erg.

Presenter(s)-Major: **Kaleigh Blaine - Pre-Nurse Allied Health, Mollie Bolsinger - Nursing, Teresa Fischer - Pre-Nurse Allied Health**
Title: EVIDENCED-BASED PRACTICE: ORAL CONTRACEPTIVES AND THE LINK TO PREVENTION OF OVARIAN CANCER
Department: Health Sciences
Sponsor: Genell Stites

Abstract: This presentation provides research results on the link between the use of oral contraceptives and the prevention of ovarian cancer. Research shows that oral contraceptives cut the risk of developing ovarian cancer for up to 30 years after use. The use of oral contraceptives can cut a woman's risk of developing ovarian cancer by 29%. This project focuses on the research regarding this issue and provides education about the immediate benefits of oral contraceptive use in preventing ovarian cancer. Women and anyone who has a loved one with the potential to develop ovarian cancer will benefit from the information presented.

Presenter(s)-Major: **Andrew Bolinger - Chemistry**
Title: THE SYNTHESIS OF PIPLAROXIDE, A NATURALLY OCCURRING INSECT DETERRENT.
Department: Physical & Environmental Sciences
Sponsor: Joe Richards

Abstract: A concise stereoselective total synthesis of piplaroxide, a naturally occurring insect deterrent from *Piper tuberculatum* and *Piper verrucosum*, has been developed using a convergent synthetic approach. The enantiomeric compound was prepared through the stereoselective synthesis of tedanalactam via Sharpless asymmetric dihydroxylation, coupled with the n-acylation of an amide with an acyl derivative.

Presenter(s)-Major: **Marisa Boraas - Chemistry, Keegan DePriest - Geology, Thomas Spain - Geology**
Title: DEPOSITIONAL ENVIRONMENT OF THE JURASSIC WANAKAH FORMATION IN WESTERN COLORADO: DIAGNOSTIC CRITERIA FOR SIMILAR SHALES AT GALE CRATER, MARS
Department: Physical & Environmental Sciences
Sponsor: Sally Potter-McIntyre

Abstract: The Jurassic Wanakah Formation is exposed throughout western Colorado and is an important seal for a proposed CO_2 sequestration reservoir, the Entrada Sandstone.

The depositional environment of the Wanakah Formation has alternately been interpreted as a restricted marine or lacustrine setting, although these interpretations are based solely on field observation rather than a comprehensive synthesis of field and laboratory analysis. The depositional environment is interpreted herein by integrating field data, petrography and stable isotope signatures ($^{34}S/^{32}S$, $^{13}C/C^{12}$, $^{18}O/^{16}O$) of gypsum and limestone samples. Field studies show main sedimentary facies present in the unit as; 1. siltstone/claystone, 2. tabular sandstone beds (<1 m thick), 3. gypsum lenses (<3m thick) and 4. thin tabular laminated limestone (<0.5m thick). This variety of lithofacies was likely deposited in a hypersaline lake system which contained algal mats (laminated limestones) and periodically desiccated to deposit thick evaporite sequences (gypsum). At Gale Crater, Mars the rover Curiosity is currently investigating one of the largest exposed stratigraphic sections consisting of similar clay- and iron-rich fine-grained gypsiferous shales. The Wanakah Formation is an excellent terrestrial analog that can be used to produce a diagnostic set of physical and chemical signatures to help interpret the depositional environment for the rocks exposed at Gale Crater.

Presenter(s)-Major: **Marisa Boraas - Geology**
Title: EARLY OLIGOCENE DRAINAGE SYSTEMS OF THE SOUTHERN GREEN RIVER BASIN
Department: Physical & Environmental Sciences
Sponsor: Andres Aslan
External Funding: National Science Foundation

Abstract: Investigations into the southern Green River Basin of Wyoming have uncovered an Oligocene fluvial drainage system. The ancient river gravels consist of two units. The uppermost correlates to the Oligocene Bishop Conglomerate, and detrital zircon studies confirm the provenance and age of this unit. These gravels are poorly sorted and consist predominantly of red Proterozoic quartzite and gray Paleozoic limestone clasts. The Bishop Conglomerate was deposited by north-flowing streams as indicated by multiple paleocurrent measurements. At locations around Flaming Gorge Reservoir, outcrops of Bishop Conglomerate overlie a second fluvial unit consisting of rounded pebble- to cobble-sized gravel that is dominated by non-red quartzite clasts and minor volcanic clasts, which are not observed in the Bishop Conglomerate. Paleocurrent data indicate that the river represented by these gravels flowed west to southwest. Detrital zircon data for the Bishop Conglomerate and the underlying fluvial gravels confirm that these two river systems drained different regions. The Bishop Conglomerate contains few early Tertiary-aged (30-40 Ma) grains and numerous Precambrian-aged grains associated with the Uinta Mountains. In contrast, the underlying fluvial gravels contain many Tertiary-aged grains and few Precambrian-aged grains. The detrital zircon data suggests that the maximum age for the fluvial gravels is ~32 Ma.

Presenter(s)-Major: **Erik Bosson - Tech Integr-Network Tech, Chandler Frith - Process Systems Technology, Jonathan Lee - Process Systems Technology, Teddi Shotts - Tech Integr -Network Tech, Forrest Zerbe - Mfg Tech -Mach Tech**
Title: CELLULOSIC BIOFUEL FROM TAMARISK
Department: Western Colorado Community College
Sponsor: John Sluder

Abstract: Cellulosic biofuel can be created from plant material, such as Tamarisk, also known as salt cedar. The Department of Energy has in the past, and will most likely in the future, allocate monies to companies for the production of ethanol as a viable alternative to gasoline. Taking an invasive, non-native, non-edible plant and converting it to ethanol will reduce the dependency on gasoline. This technique would help with reducing global warming and will not impact our food supply. Producing ethanol requires three phases: digestion, fermentation and distillation. During this process, program logic controllers (PLC) will be used to monitor the temperature and pressure while relaying this information over a computer network with remote access.

Presenter(s)-Major: **John Box - Tech Integr Clust-Network Tech, Chris Greff - Mfg Tech Mach Tech, John Nolan - Tech Integr Clust-Network Tech, Yesenia Pena - Tech Integr Clust-Network Tech**
Title: LED STREET LIGHTS
Department: Western Colorado Community College
Sponsor: John Sluder

Abstract: The exaggerated electricity costs to light up Colorado's streets have encouraged many to find alternative lower-cost options. One of these options is to use solar panels with a

sun tracking system to power up streetlights. By doing this, Colorado can save a great deal of money and make use of a naturally abundant source. Moreover, by tracking the sun, Colorado's communities can benefit by increasing the efficiency of the product. This could be achieved by having a sensor observe the sun, a controller periodically check the sensor readings, and having the motor move the panels in the direction where it can absorb the most energy. The energy collected during the day is then stored in a battery, where LED Lights would then be run off of the battery during night hours. The mounting system for the LED streetlights and solar tracking system will allow Colorado to use as many existing streetlight posts as possible. This will allow an easier transition into a natural and more efficient way of producing light with fewer complications and expenses to light up Colorado's streets.

Presenter(s)-Major:	**Eric Bradford - Chemistry, Alexander Brown - Chemistry, Justin Edmonds - Pre-Engineering, Bernardo Felix - Chemistry, Daniel Ohlson - Chemistry, Matthew Sleck - Chemistry**
Title:	INVESTIGATION OF GOLD(III) COMPLEXES FOR THE EFFICIENT UTILIZATION OF NATURAL GAS AND PETROLEUM FEEDSTOCKS
Department:	Physical & Environmental Sciences
Sponsor:	David Weinberg

Abstract: Methane, the primary component of natural gas, is an abundant feedstock for fuels and chemicals. However, methane gas is relatively difficult to store and transport. Direct, efficient conversion of methane into liquid chemicals would thus be useful. Unfortunately, the strong sp^3-hybridized C-H bonds in methane are difficult to selectively functionalize. Most methane conversion catalysts suffer from a lack of selectivity leading to overoxidation or from low turnover numbers and rates. While gold has shown a lot of potential for the selective functionalization of methane and other strong C-H bonds, gold(III) has not definitively been shown to either activate or functionalize strong, sp^3-hybridized C-H bonds in high yields. As such, chelating ligands have been synthesized to facilitate these reactions by directing gold(III) toward strong, sp^3-hybridized C-H bonds. Gold(III) complexes of these ligands have been synthesized, and preliminary C-H bond activation studies have begun.

Presenter(s)-Major:	**Joshua Brady - Spanish-Applied Professional**
Title:	AMANTE DE LA LIBERTAD
Department:	Languages, Literature & Mass Communication
Sponsor:	Mayela Vallejos-Ramírez

Abstract: This is one of five Student Showcase presentations exploring the role of women in Latin American war movements through the lens of Hispanic prose. Using *Manuelita Saenz* by Alejandra Jaramillo Morales as a base, the presenter will re-enact the relationship between Simon Bolivar and Manuelita Saenz from the viewpoint of Simón Bolivar. This dramatized presentation will focus on how Manuelita helped Simon Bolivar throughout the independence movement. The presenter will give specific examples of both the physical and mental influences that Manuelita had over Simon Bolivar.

Note: This presentation will be given in Spanish.

Presenter(s)-Major:	**Kenneth Bretey - Mechanical Engineering, Jesse Brewer - Mechanical Engineering, Jesse Coquoz - Mechanical Engineering, Jason Johnson - Mechanical Engineering, Jason Logsdon - Mechanical Engineering, Weston Vorderberg - Mechanical Engineering**
Title:	PLASMA ELECTROLYTIC OXIDATION: ENHANCED ANODIZING
Department:	Mechanical Engineering
Sponsor:	Francisco Castro
External Funding:	Calphalon, Lewis Engineering, Spendrup Fan, and Engineered Coatings Inc.

Abstract: Plasma Electrolytic Oxidation (PEO) was performed on aluminum and titanium alloys to improve material characteristics including wear and corrosion resistance, hardness, electrical conductivity, and surface energy according to sponsor requirements. PEO is an enhanced anodizing process that utilizes electrolytic passivation of a material surface. This is a second year continuation of a mechanical design project conducted at the University of Colorado-Boulder-Colorado Mesa University (CU-CMU) mechanical engineering partnership program sponsored by Calphalon, Lewis Engineering, Spendrup Fan, and Engineered Coatings Inc. Suggested chemical and electrical parameters will

be presented in conjunction with microstructure analyses and verification of improved material characteristics according to sponsor requirements.

Presenter(s)-Major: **Calvin Brewer - Computer Science, Thomas Lambert - Computer Science, Cullen McDevitt - Computer Science, Alexandra Shepard - Mathematics**
Title: FIELD WORK DATABASE APPLICATION
Department: Computer Science, Mathematics & Statistics
Sponsor: Lori Payne

Abstract: Many companies across the world still use paper forms to keep track of their records. Paper records are difficult to keep track of and also difficult to reference in the future. Some companies have entire rooms full of paper records, but without proper organization these records are difficult to access. This application eliminates the need for paper records and will allow for constant access to any information previously recorded. The application allows the user to input field-work information and upload the information to the company's database. The application will also allow the user to search and view, as well as delete, a record from the database. The design and color combinations make the application aesthetically pleasing to the user and also easily usable by even the most novice computer user. The resulting application will allow a company to be more organized, which in turn creates a more efficient and productive work environment.

Presenter(s)-Major: **Kole Bridge - Spanish-Literature & Language**
Title: LAS SOLDADERAS
Department: Languages, Literature & Mass Communication
Sponsor: Mayela Vallejos-Ramírez

Abstract: This is one of five Student Showcase presentations exploring the role of women in Latin American war movements through the lens of Hispanic prose. The novel *Las Soldaderas: Women of the Mexican Revolution* by Elena Poniatowska is a journey through the forgotten plight of women soldiers during the Mexican Revolution. By employing a combination of narrative and visual elements, the novel explores the contributions and sacrifices of women throughout the violent struggle for independence. The presenter will analyze different aspects of Las Soldaderas and the manner in which they affected the movement towards liberty for the Mexican people. Though history has overlooked a great deal of the contributions of women during the Mexican Revolution, the work of Poniatowska reminds the world that many women contributed their minds, bodies, and souls to the cause.

Note: This presentation will be given in Spanish.

Presenter(s)-Major: **Louis Brindisi - Kinesiology-Sport Management**
Title: THE EFFECTS OF ALCOHOL CONTRIBUTING TO SPORT FAN VIOLENCE
Department: Kinesiology
Sponsor: Elizabeth Sharp

Abstract: The following study was conducted to show the effects of alcohol contributing to sport fan violence. Interviews and observations were used to gather viewpoints of fans at Denver Broncos home games and a local sport bar. Many noticeable changes were discovered during research. The major conclusions gathered from this study were: 1) Drinking alcohol excessively does cause fan violence. 2) Drinking alcohol excessively and coupling it with a rivalry match-up increases fan violence more than drinking excessively by itself. 3) Rivalry match ups do increase tensions by themselves, but without alcohol there is usually no violence associated. These results can be used to show that serving alcohol at a sporting venue can increase a sporting venue's risk. This may help such a sport venue implement a more stringent alcohol policy.

Presenter(s)-Major: **Megan Bronson - History-Teaching (Secondary), Gregory Harper - History**
Title: WHEN WOMEN LOOK AT MEN: PART 3 OF 3
Department: Social & Behavioral Sciences
Sponsor: Sarah Swedberg

Abstract: Because historically men have been in positions of formal power, the historical record is filled with how men looked at women and how men defined women's roles in society. We know far less about how women looked at men and how women defined men's roles in society. In 1963, John A. Kouwenhoven and Janice Farrar Thaddeus sought to change this through the publication of an anthology entitled *When Women Look at Men*. As a year-long project for the academic year 2012-2013, the students in American women's history courses (HIST 370 and HIST 371) have engaged with updating this anthology for the first time. The students rewrote the introduction to the original anthology to reflect the changes experienced by women in the last half century, and updated the original categories. They hope that through their work, they will help contribute to a published anthology that can be used in history courses throughout the country. The research presents an often ignored and neglected viewpoint. The presenters will emphasize the importance of this project, talk about the process in which they engaged, and detail what they found and learned.

Note: This is part three of a series. See also *WHEN WOMEN LOOK AT MEN*: PART 1 OF 3 and *WHEN WOMEN LOOK AT MEN: PART 2 OF 3*.

Presenter(s)-Major: **Jolee Brown - Liberal Arts, Elem Teaching, Kelci Crispe - Liberal Arts, Elem Teaching, Rachel Smith - Liberal Arts, Elem Teaching**
Title: TIE DYE MILK
Department: Teacher Education
Sponsor: Jennifer Daniels

Abstract: The main focus of this experiment is color and pigments. In order to test how colors mix, the experiment assesses the mixture of four different colors in a liquid form. In order to perform this experiment, four different colors of food coloring are dropped with equal amounts into a plate of milk and disturbed by a drop of dish soap. When looking deeper into the results, the different chemicals in the different dish soaps were examined to discover why they had the reaction they did with the certain type of milk and the food coloring. The different milks tested were: whole, 2%, 1%, and rice, and almond milk. The soaps tested were: Dawn, Palmolive, Gain, and Great Value. Each plate of milk had enough milk to cover the entire surface area, one drop of food coloring per color, and one q-tip covered in dish soap.

Presenter(s)-Major: **Katie Brown - English-Writing**
Title: PEARLS OF WISDOM: THE CULTURAL SIGNIFICANCE OF JANIS JOPLIN'S "MERCEDES BENZ"
Department: Languages, Literature & Mass Communication
Sponsor: Barry Laga

Abstract: Janis Joplin's song, "Mercedes Benz," is noticeably different from any other song on the album titled *Pearl*. It is considerably shorter than the other tracks at a mere one minute and forty-six seconds; she sings it a cappella; and it is the only song that Janis introduces on the album when she says, "I'd like to do a song of great social and political import." It is clear from this introduction that this little ditty, in spite of its brevity and lack of accompaniment, contains an important message, but what is it? According to a theory known as New Historicism, we can understand problematic texts by situating them within the historical context in which they were written. Therefore, in order to understand what the "social and political" message is, we need to closely examine the social and political concerns of the 1960s. When we look at the song, "Mercedes Benz," within the social and political framework of America in the 60s, we can see that it functions as an anthem for the hippie counter culture by mocking religious beliefs, devalorizing commercialism and criticizing materialistic practices that were so prevalent in that particular era in American history.

Presenter(s)-Major: **Denise Bryndal - Nursing, Jordan DeJulio - Nursing, Angela Vassallo - Nursing**
Title: HAND HYGIENE COMPLIANCE IN THE WORKPLACE
Department: Health Sciences
Sponsor: Genell Stites

Abstract: Studies have found that hand hygiene compliance rates are low. Many factors are associated with poor compliance and include glove use, lack of time due to heavy workloads, lack of convenient access to hand sanitizer or hand washing areas, and forgetfulness. Good hand hygiene is one of the most important factors in preventing the transmission of microorganisms to and between patients in health care settings. Through a literature review, researchers will examine factors associated with hand hygiene compliance, and identify methods to improve compliance.

Presenter(s)-Major: **Sage Rose Buchalter - Theatre Arts-Music Theatre**
Title: EVERYBODY SAYS DON'T
Department: Theatre
Sponsor: Jeremy Franklin

Abstract: In the arts industry, one is told that in order to succeed one should follow a set of rules: you can't do that, you must do this, and you should not make "that" decision there. However, as creative beings, we must reach far beyond ourselves and take risks in order to progress. The presenter will be singing "Everybody Says Don't" from the musical *Anyone Can Whistle* by Stephen Sondheim. "Everybody Says Don't" challenges the rules of social etiquette, and thereby asks the listener to let go of fear. The goal of this performance is to remind the world that to take a stand one must first be willing to take a chance. This presentation is part of the performer's capstone project where she will be performing a 30-minute cabaret on May 4th. Doug Morrow is accompanying.

Presenter(s)-Major: **Sarah Bullock - Theatre Arts-Dance**
Title: MOVEMENT STUDY
Department: Theatre
Sponsor: Tracey Bonner

Abstract: Dance is a physical sensation of motion; one that should be realized through movement. Movement is a natural action for the human body; a necessity, similar to breathing. We all move and breathe in our own individualized way. The choreographer is presenting a trio that encompasses this idea of movement manipulation in a way that feels natural to the dancer. Through this process, the choreographer has taught the same movement phrases to each dancer and asked them to perform it in a way that feels natural to their body. Some dancers may slow down the tempo, while others may increase it. Dancers may choose to extend through their arms and use a directional focus or could choose to initiate the movement from a lower part of their body. The choreographer wanted to discover what could happen if the dancers felt, rather than did. Movement is natural and individualized to the human body. When we can let go and sense our natural instincts, rather than do what we are supposed to do, the results are organic and beautiful. (Dancers: Vicky Stone, Kayla Bagay, and Taylor Newman.)

Presenter(s)-Major: **Trevor Burrell - Geology, Anna Dunn - Geology, Ryan Hampton - Geology, Environmental**
Title: STUCTURE OF THE LARAMIDE-AGE REDLANDS MONOCLINE, COLORADO NATIONAL MONUMENT, WESTERN COLORADO
Department: Physical & Environmental Sciences
Sponsor: Richard Livaccari

Abstract: The Laramide-age, NW-SE striking Redlands Monocline and reverse fault are the dominant structures of Colorado National Monument (CNM). The Redlands Fault dips steeply 60 to 85 degrees SW and places Proterozoic basement rocks over NE-dipping Mesozoic strata of the monocline. Strata associated with the monocline dip 80 to 30 degrees NE with up to 1,600 ft of vertical displacement along the fault. Overturned strata in Gold Star Canyon has been thinned 20 – 30% of its original thickness and dips 50 to 85 degrees SW. The width of the monocline broadens southward to 2,000 ft in the area of the East Entrance of CNM., The strata are not significantly thinned, and the monoclinal dips are 18 to 37 degrees NE. The Redlands Fault steps NE along an S-dipping lateral ramp in an unnamed canyon NW of the East Entrance of CNM. The lateral ramp has reverse-slip displacement, dips 63 degrees S and results in a 350 ft

offset of the Redlands Fault. It is likely that the fault splits from a single fault along the narrow portion of the Redlands Monocline in the Gold Star Canyon area to multiple, subparallel splays in the East Entrance area where the monocline broadens.

Presenter(s)-Major: **Gabriele Cahill - Theatre Arts-Dance**
Title: FILOVIRIDAE
Department: Theatre
Sponsor: Tracey Bonner

Abstract: Dance movement is used with the intent to tell stories and inform an audience of new concepts. Now dance is applied in science lectures in universities to properly demonstrate concepts and theories. The presenter's interest lies in bringing the art of dance and science together by creating a duet concerning the mutilation of human cells when infected with the Ebola virus. Through the choreographic experience, the dancers will explore the use of rhythm, partnering, tempos, shaping, spacial efforts, and long complex phrases to build the climactic relationship between cells and filoviridae. The applied theory and movement will allow others to understand that dance may be used for scientific research and can be used in educational institutes. (Dancers: Korey Van Hoy and AJ Labrum.)

Presenter(s)-Major: **Courtney Campbell - Env Sci & Tech-Env Science, Jennifer Hamilton - Environmental Science and Tech, Skyler Nelson - Env Sci & Tech-Env Science, Lukas Schmalz - Env Sci & Tech-Env Science**
Title: COMPARING LONG-TERM EFFECTIVENESS OF THREE CUT-STUMP METHODS OF TAMARISK CONTROL
Department: Physical & Environmental Sciences
Sponsor: Deborah Kennard

Abstract: In 2007, a team of Environmental Science majors from Colorado Mesa University conducted a study comparing removal methods for the noxious weed tamarisk (Tamarisk sp). Three blocks were used with four different treatments plots including: a control without any tamarisk removal, a plot with stump cutting, a plot with stump cutting and immediate herbicide application, and a plot with stump cutting and delayed herbicide treatment. Further analysis of the site has not been made at the site since the initial stump cuttings in 2007. For their senior capstone project, the group will research the most effective means of Tamarisk removal by analyzing the plots from the original capstone project completed in 2007. The goal is to determine the most effective cut-stump method in long-term Tamarisk control. The original blocks will be evaluated, with the same methods as the original study, by measuring stem density, diameter at breast height, basal diameter, and canopy cover of tamarisk, percent tamarisk beetle defoliation of the tamarisk, percent cover of other existing species, and soil characteristics. Using the collected data, they will use ANOVA in SPSS for analysis of variance to determine if there is a significant difference between each of the methods compared to the control and each other to determine the most effective tamarisk control method. The data analysis and final report will be submitted to Westwater Engineering Co and for the capstone presentation.

Presenter(s)-Major: **Benjamin Carlson - Theatre Arts-Music Theatre**
Title: I CAN'T STAND STILL
Department: Theatre
Sponsor: Jeremy Franklin

Abstract: The presenter will be performing the song "I Can't Stand Still" from the musical *Footloose* by Tom Snow. In the show *Footloose*, the character Ren McCormack has just moved from Boston to the small town of Beaumont, Texas - a town that has outlawed dancing. Being a dancer, Ren expresses his feelings toward the law in the song. This performance is a portion of the presenter's capstone project, a cabaret based on the theme of stereotypes encountered in one performer's life. The performer chose this song because it showcases skills in dancing, singing, and acting. The performer is accompanied by Doug Morrow.

Presenter(s)-Major: **Stephanie Carter - Mass Comm-Public Relations, Anne Halverstadt - Mass Comm-Public Relations, Kathryn Wenzinger - Mass Comm - Media Strategies**
Title: CULTIVATION THEORY AND THE COLUMBINE SHOOTING
Department: Languages, Literature & Mass Communication
Sponsor: Eric Sandstrom

Abstract: April 20,1999 the Columbine Massacre struck news outlets all over the country. With so many media outlets wanting to cover these tragic events, it was turned into an intriguing drama. This is when the media took it upon themselves to begin the "blame game." As soon as people started getting wind of who was to blame for the hatred these two killers had worked up, people began believing it. Some said video games, some said violence on television, and even music. With the media broadcasting these ideas, people began to be deceived and started believing everything the media was saying. Through cultivation theory, (the thought that "television can bring out the shared viewing of the world, and cultivates certain views across all segments of society,") this presentation will show that media coverage of Columbine cultivated people into blaming who they did. Through peer reviewed articles and a survey of students and faculty from Colorado and surrounding states, this project will study the process of cultivation and attempt to answer the question: were people cultivated by media into blaming who they did for the Columbine shooting?

Presenter(s)-Major: **Courtney Carver - Psychology, Matthew Lescroart - Psychology-Counseling Psych**
Title: THE RELATION BETWEEN OUTDOOR RECREATION AND BENEFITS SOUGHT
Department: Social & Behavioral Sciences
Sponsor: Brian Parry

Abstract: The purpose of this study was to conduct an experiment to identify any relationship of a recreation setting to the benefits sought by users. This is important to identify because the entire public has a stake in how the public lands are managed, and conflict inevitably arises between groups with competing visions. By matching the benefits with the recreation setting, the research will determine why people engage in outdoor recreation and identify the desired benefits for outdoor recreationists. The data will be used to help manage the lands in a way that allows users to achieve their desired benefits. In order to obtain information for this study, the researchers gathered information from a previous study that determined if the population agreed or disagreed with the benefits sought by engaging in outdoor recreation. Parry, Galloup, and Franz (2012) identified seven core outdoor recreation constructs: community cohesion, economic benefits, relationship with nature, physical enhancement, intrapersonal relations, mental serenity, and independence. The current study is aimed at applying these constructs to outdoor recreation settings in order to determine the relationship between the settings and recreation constructs.

Presenter(s)-Major: **Brian Casaus - Theatre Arts-Acting/Directing**
Title: OF MICE AND MEN
Department: Theatre
Sponsor: Jeremy Franklin

Abstract: The presenter will be performing Act III, Scene I from *Of Mice and Men*, a play adopted by John Steinbeck from his own novel. The third act begins with Lennie having accidentally killed a puppy, an action he fears will anger his travel companion George. The purpose of the act is to understand that people who are mentally challenged do have feelings as well. This performance reflects an actor's study of a mentally-challenged man living in the depression era.

Presenter(s)-Major: **Melissa Casto - Env Sci & Tech-Env Science**
Title: THE EFFECT OF FIRE ON DENSITY OF INSECT BURROWS ON THE COLORADO NATIONAL MONUMENT
Department: Physical & Environmental Sciences
Sponsor: Deborah Kennard

Abstract: Two years ago on the Colorado National Monument, an experimental prescribed burn was performed to study the effects of fire on an old growth stand of sagebrush, and to see if fire would increase forage quality. What was not studied at the time was the effect of fire on burrowing insects. Because insects are such an important

part of any ecosystem, it is important to understand how they adapt to change in their environment. It is known that more plant cover can provide more shelter, food, and water for insects. This study analyzed whether increased vegetative cover would indeed result in a greater density of burrowing insect burrows.

Presenter(s)-Major: **Keith Chappell - History**
Title: HISTORY ON FILM
Department: Social & Behavioral Sciences
Sponsor: Vincent Patarino

Abstract: History has been written and presented in many forms. One of the most novel and problematic is the use of film to depict history. Historical films have captured the imagination of many historians because of their broad appeal to the public, creating an opportunity to present historical knowledge to a much larger audience than what is offered by traditional written history. Use of film to produce historical works has had a significant impact on the history profession and has led to disagreements concerning its use. For example, some historians have criticized film as fundamentally incapable of being "real" history. This presentation will explore the debate between those who support film as a means of presenting historical knowledge and those who oppose it. The core arguments of this presentation will draw upon the work of Robert A. Rosenstone, a scholar who has championed the view that filmmakers can function in the same way as historians. His work has appeared in the *American Historical Review* and especially in the book *History on Film, Film on History: History: Concepts, Theories, and Practice*. Challenges published in response to Rosenstone's thesis will also be discussed. The presenter will also examine several historical films to assess their presentation in contrast with written history and to discuss whether the profession can accurately consider filmmakers to be historians. The debate over the use of film in history will shape the future of the historical profession, and contributions from historians can improve film and maximize its potential as a tool for disseminating historical knowledge.

Presenter(s)-Major: **Tyler Chase-Nason - Computer Science, Mark Liedtke - Computer Science, Ethan Lindauer - Computer Science, Mark McDonald - Computer Science**
Title: FORENSIC ENVIRONMENTAL TREND ANALYSIS (FETA) SOFTWARE
Department: Computer Science, Mathematics & Statistics
Sponsor: Warren MacEvoy

Abstract: The Forensic Investigation Research Station (FIRS) at Colorado Mesa University is one of five such research stations in the nation. It therefore presents a unique opportunity for CMU students for project work in this field. As part of its laboratory operations, there are data sets generated for analysis. Since it is the case that no two labs and no two researchers are alike, there is a need for analysis software that is customized for the end user. The presenters will describe analysis software designed in collaboration with the FIRS project at CMU.

Presenter(s)-Major: **Victoria Chavez - General Engineering, Christopher Walters - Geology, Environmental**
Title: REORGANIZATION OF SOUND WAVES INTO SQUARE WAVES THROUGH THE USE OF A TESLA COIL
Department: Mechanical Engineering
Sponsor: Scott Bevill

Abstract: In around 1891, Nikola Tesla developed the self-named Tesla Coil as an alternative to provide electricity to the masses. The design received an alternating current input and produced a magnified high voltage, low current, high frequency alternating current output. While it was not adopted as an alternative to the power grid used today, it has been used to showcase the powers and versatilities of AC power. This project involves the use of a Tesla Coil as a plasma speaker to interpret an AC signal and to reorganize it into a square wave in which can be heard an audible sound. With a collection and series of pitched square waves, it will produce music similar to a synthesizer, bringing awareness to the versatility of the Tesla Coil and alternating current as opposed to a direct current.

Presenter(s)-Major: **Kaemen Chiles - Tech Integration -Network Tech**
Title: RIM ROCK DATABASE
Department: Business
Sponsor: Gayla Jo Slauson

Abstract: An Access database that has been created for a local enterprise will be presented. This database was created as an inventory and tracking tool for Rim Rock Exploration and Development Incorporated. It was created using Microsoft Access as the database management system. It will be used by Rim Rock to monitor and report equipment inventory, it then will be used as a tool to aid in ordering new parts and equipment for the company.

Presenter(s)-Major: **Jared Christensen - Computer Science, Christina Reed - Mathematics, Eric Sisneros - Computer Science, Orion Stanger - Computer Science**
Title: GOOGLE MAPS MEET YOUR RIVAL - JECO MAP
Department: Computer Science, Mathematics & Statistics
Sponsor: Lori Payne

Abstract: Ever been lost wandering around campus? How about looking for that one obscure classroom? Have you ever wished there was an easier way to find something on campus besides that "lovely" campus map strategically posted on the bulletin boards? JECO Map is here to provide guidance to students and visitors alike! JECO Map is an interactive campus map that provides a way for people to easily learn their way around CMU. Visitors can get directions from parking lots to the University Center or perhaps the Moss Performing Arts building. Students are able to locate individual classrooms and professors' offices or even get their entire schedule drawn out on the campus map. Students are also able to print their map to bring with them for the journey! Come join us at the Student Showcase and take a peek! Just don't get lost, alright?

Presenter(s)-Major: **Natalie Clayton - English-Teaching (Secondary)**
Title: A CROSS POLLINATION: JAME JOYCE'S *CHAMBER MUSIC*
Department: Languages, Literature & Mass Communication
Sponsor: Barry Laga

Abstract: *Chamber Music* is a collection of thirty-six short poems, written and revised by James Joyce between 1901 and 1906 and then published in 1907. The poems, all dealing with love, were met with mixed reviews; some heralded the work as charming, others as trivial. There is, however, an immediate puzzle presented in *Chamber Music* that cannot be ignored—its title. Why would Joyce choose to present these seemingly simple love poems as an artistic genre other than writing? The text itself begs us to discuss the poems in terms of music, not literature. This presentation will explore how musical concepts such as form, climax, dissonance, and key lend themselves to an interpretation of Joyce's *Chamber Music* as not simply a collection of poems with a curious title but a single, unified chamber music piece in binary cyclical form.

Presenter(s)-Major: **Natalie Clayton - English-Teaching (Secondary)**
Title: CONTACT ZONES, WHITENESS, AND WINDIGOS IN MICHAEL DORRIS' *A YELLOW RAFT IN BLUE WATER*
Department: Languages, Literature & Mass Communication
Sponsor: Julie Barak

Abstract: This presentation will explore how Michael Dorris approaches key issues in Native American Renaissance literature in his 1987 novel *A Yellow Raft in Blue Water*, specifically looking at loss of identity. Beginning with the application of the theory of contact zones (social spaces where cultures meet, clash, and grapple with each other, often in contexts of asymmetrical relations of power), this presentation will trace how these contact zones replace the Native American community, and how this post-colonial break-down leaves the Native American identities of Dorris' three main characters susceptible to "whiteness." Finally, the presenter will explore how this "whiteness" ultimately manifests itself in the mother character, Christine, as she takes the form of a Windigo—or an "evil spirit that devours mankind"—a Native American mythological creature. This framework provides a helpful way to interpret characters in the novel who would otherwise be difficult to understand and sheds light on an issue central to the majority of Native American Renaissance literature.

Presenter(s)-Major: **Natalie Clayton - English-Teaching (Secondary), Katie Walters - English-Literature**
Title: CHALLENGING THE STIGMA: A UNIQUE EXPLORATION OF THE FOUR-CHORD SONG"
Department: Languages, Literature & Mass Communication
Sponsor: Barry Laga

Abstract: This will be a student-created a capella performance featuring a VE-20 Boss vocal performer. The purpose of this creation is to challenge the stigma of the "four-chord" song, as well as that of the nature of "duo." Four-chord songs are often viewed as simplistic and even uncreative. However, by creating and layering a series of vocal loops with the vocal performer, the presenters will create a real-time, harmonious progression in order to expand the view of this popular song form, and show that this kind of music technology facilitates this expansion, allowing audiences to view the four-chord song in a new light.

Presenter(s)-Major: **Jeremy Cleaveland - Mechanical Engineering, Daniel Gatt - Mechanical Engineering, Britton Humphrey - Mechanical Engineering, Kristopher Sharpe - Mechanical Engineering**
Title: AUTOMOBILE TURBOCHARGER GAS TURBINE ENGINE
Department: Computer Science, Mathematics & Statistics
Sponsor: Richard Ott

Abstract: In thermodynamics there are four different types of power cycles: Rankine, Otto, Diesel and Brayton. The Rankine cycle is used in steam power plants, Otto and Diesel cycles are used in automobiles, and the Brayton cycle is used in gas-fired power plants. The presenters will model a Brayton cycle by turning an automobile turbocharger into a gas turbine engine. Air is compressed on the compressor side of the turbocharger and flows into the combustion chamber where propane is injected and ignited. The heat and pressure of combustion will spin the turbine on the exhaust side of the turbocharger which is connected via a shaft to the compressor creating a self-sustaining power cycle. The modeled Brayton cycle will be analyzed using thermodynamics for net power achieved and efficiency of the cycle. A statistical analysis will also be conducted to see the effects of fuel flow rate on net power and efficiency of the cycle.

Presenter(s)-Major: **Cody Cline - Computer Science, Treyce Fenske - Computer Science, Cameron Mills - Computer Science, Craig Weir - Computer Science**
Title: BEER SHENANIGANS
Department: Computer Science, Mathematics & Statistics
Sponsor: Warren MacEvoy

Abstract: The artisan brewery business is a struggling enterprise in the world of mass-produced adult beverages. In order to keep overhead to a minimum, the brewers and managers are using outdated practices to track and manage inventory, sales, and production. The goal for this project is to make a clean, user-friendly, and highly-functional open-source application for inventory and process management of artisan brewery establishments. This group of students is writing a Java program for Palisade Brewing Company to keep track of ingredients used to make beer, the amounts and sales of the finished product, and everything in between. The client emphasized a need to compute ingredient use per batch of beer brewed, as well as an equipment use and planning program. The students are also creating and outputting Federal and State tax paperwork, an implementation that will reduce the time employees spend on redundant data entry and analysis. The process includes bi-weekly progress meetings with the client for needs assessment and quality control.

Presenter(s)-Major: **Taryn Hope Cochran - Theatre Arts-Music Theatre**
Title: SOMEONE ELSE'S STORY
Department: Theatre
Sponsor: Jeremy Franklin

Abstract: Music Theatre is a form of artistic expression using songs, spoken dialogue, acting and dance to create a story. The performer will present a ballad "Someone Else's Story" from the 1984 musical *Chess* written by Tim Rice, Benny Andersson, and Björn Ulvaeus. *Chess* is a story based on the U.S. and the Soviet Union fighting the Cold War through a chess tournament. The ballad "Someone Else's Story" is about the contemplation of an American woman named Florence who falls for the Soviet, Anatoly.

She wants to be with him but she is not completely sure. "Someone Else's Story" was added in the 1986 musical score, and sung by English singer and actress Elaine Page. This ballad will be accompanied by Douglas Morrow on piano.

Presenter(s)-Major: **Matthew Cooper - Mechanical Engineering, Craig Freeborn - Mechanical Engineering, William MacDonald - Mechanical Engineering, Jeremy Skoog - Mechanical Engineering**
Title: BUILDING A TURBINE ENGINE TO GENERATE POWER
Department: Mechanical Engineering
Sponsor: Nathan McNeill

Abstract: The students taking Thermodynamics II built a turbine engine that is capable of generating measurable power. The project consisted of building and testing a turbine engine from a repurposed automobile turbocharger, as well as taking temperature measurements to analyze real world implications and statistical variation. The turbine engine will be brought to steady state conditions and two thermocouples will record intake and exhaust temperatures. The variance of the values will be examined and compared against established probability distributions.

Presenter(s)-Major: **Jesse Coquoz - Mechanical Engineering**
Title: IMPROVED DESIGN FOR A REACTIVE POWDER CONTAINER
Department: Mechanical Engineering
Sponsor: Francisco Castro

Abstract: Capco Incorporated, a business located in the Grand Valley, was in need of modifying one of its manufacturing processes. This process included a cylindrical container that held a powder component for the product. Conditions around the powder had to be controlled because of the reactivity of the powder. The original design of the container required frequent transfer and refill of the powder, increasing the risk of mishandling the powder. A new container was designed reaching 95% efficiency and decreasing the number of transfers and refills required per day. A thermoforming process was implemented for the construction of the container, and a laser cutter was utilized in the construction of a modular holder for the container.

Presenter(s)-Major: **Alicia Crespin - Biological Sciences-Biology**
Title: THE EFFECT OF ELEVATION ON CATERPILLAR DEVELOPMENT TIME
Department: Biological Sciences
Sponsor: Thomas Walla
External Funding: National Science Foundation

Abstract: The abundance and diversity of insect populations depend on larval development rates which determine the capacity for population growth. Insect larval development can be influenced on a broad scale by climate, latitude, and elevation, driving fundamental differences in the density of species. Development rate is hypothesized to be controlled by multiple variables including temperature, predation pressure, and, in herbivorous insects, variation in host plant quality. Considerable evidence also indicates development rates may be influenced by evolutionary history and phenotypic plasticity. Preliminary data from this project indicate that larval development rates vary by nearly four fold along an elevation gradient in Ecuador. To test the hypothesis that temperature is the primary factor driving larval development rate, caterpillar transplant experiments were performed between 2000m and 1000m of elevation in the Ecuadorian Andes. The results indicate that development rates are influenced by ambient temperature but are also phenotypically plastic depending upon the larval stage in which temperature is manipulated. The results are interpreted in the light of insect herbivore population density, climate change, and the evolution of life history traits.

Presenter(s)-Major: **Melissa Cunningham - Mathematics-Statistics, Mira Hopkins - Pre-Engineering, Devin Montgomery - Pre-Engineering, Roy Perez - Pre-Engineering, Matthew Severinsen - Pre-Engineering**
Title: KINETIC POWERED HEATED ICE SCRAPER
Department: Mechanical Engineering
Sponsor: Nathan McNeill

Abstract: Almost nobody will admit to enjoying scraping a car windshield on a cold winter morning. What if there was a more efficient way to remove snow and ice from a car? This team of first-year engineering students is improving the windshield ice scraper. Heating elements in the ice scraper will keep the user's hands warm while helping melt ice and snow off of the windshield. This project demonstrates conductivity of the materials used, Ohn's law, and the conversion of electric power to heat power.

Presenter(s)-Major: **Adam Dahl - Process Systems Technology, Max Spangler - Mfg Tech Cluster-Mach Tech, Anthony Vanden-Plas - Process Systems Technology, Karen VanHoy - Tech Integr Clust-Network Tech**
Title: COMPRESSED NATURAL GAS (CNG) GENERATOR ENGINE CONVERSION
Department: Western Colorado Community College
Sponsor: William McCracken
External Funding: Encana Corporation

Abstract: Compressed Natural Gas (CNG) is a natural gas and is a substitute for gasoline, diesel fuel, or propane/LPG. During emergencies such as hurricanes, snowstorms, and power outages, gasoline can be in short supply, whereas CNG is often readily available. CNG is also cheaper and will store longer than gasoline. Running a generator on gas for a period of two weeks would cost around $500, whereas running a generator on CNG for two weeks would cost around $25. CNG is 45% cleaner energy. Using a conversion kit, a gasoline generator can be converted to run on CNG or propane very easily. Wheels will be added to the frame to make it portable. A 10-gallon tank can run the 4000 watts generator for 36 hours, were a 5-gallon tank of gasoline will run for 10 hours. Another option would be to hook up the generator to the home gas meter.

Presenter(s)-Major: **Lucas Davenport - Geology**
Title: A NEW TECHNIQUE FOR IDENTIFYING THE ILLITE-SMECTITE BOUNDARY IN THE BRUSHY BASIN MEMBER OF THE JURASSIC MORRISON FORMATION
Department: Physical & Environmental Sciences
Sponsor: Andres Aslan

Abstract: The Brushy Basin Member of the Late Jurassic Morrison Formation is composed of sandstones, claystones, mudstones, and tuffs that accumulated 153-145 Ma in a closed alkaline, saline lake known as Lake T'oo'dichi' which was present in western Colorado. Mudstone and claystone are the dominant lithologies in the Brushy Basin Member, and contain abundant clay minerals including illite and smectite. Illite is potassium (K) rich whereas smectite is potassium deficient. Previous workers have identified a distinct transition from illite-dominated mudstones in the lower portion to smectite-rich mudstones in the upper part of the Brushy Basin Member. The purpose of this project is to find out if it is possible to locate these illite/smectite transition zones in Brushy Basin member using a scintillometer to measure radiation due to high quantities of ^{40}K. If so this technique would provide a much more efficient means for mapping this boundary and determining its origin.

Presenter(s)-Major: **Tina David - Decision Support,**
Dylan Vigil - Kinesiology-Sport Management
Title: PRETTY IN PINK PAGEANTS
Department: Business
Sponsor: Gayla Jo Slauson

Abstract: The objective was to develop a Pretty in Pink database for a local pageant. The database will be used to keep track of how contestants do during each pageant by keeping track of scores, awards, and pageants that the contestants attend. This will provide students with the opportunity to take what they learned out of the classroom and gain valuable skills from working with a real-life situation.

Presenter(s)-Major: **Chad Davis - Accounting-Public Accounting**
Title: LEHMAN BROTHERS
Department: Business
Sponsor: Craig Fossett

Abstract: This presentation will discuss Lehman Brothers and the implications of fraud within that organization. The presentation analyzes the company looking at money, ideology, coersion and ego. Using these subjects to discuss the company as a whole will give the audience an understanding of fraud that could have occurred but without any prosecution. There will then be a discussion as to why there has been no legal actions brought against the company.

Presenter(s)-Major: **Griffen Davis - Theatre Arts-Acting/Directing**
Title: ACTORS SHOWCASE
Department: Theatre
Sponsor: Jeremy Franklin

Abstract: As an Acting/Directing major, Griffen Davis' senior project includes three monologues and a scene that will demonstrate, not only his range, but also the range of methods and ideas the department teaches their students. The particular scene being presented for the Showcase will be a cutting from Samuel Beckett's *Waiting for Godot*, a very popular play that delves deep into the human condition and highlights the author's belief in existentialism. With the showing of this piece, as well as performances from colleagues, the performers hope to better inform the community as well prospective students what CMU's Theatre department is capable of and the talent that it is sending out into the world.

Presenter(s)-Major: **Michelle Davis - Geology**
Title: A STUDY OF THE RELATIONSHIP BETWEEN THE ORIENTATION OF STRUCTURAL JOINTS AND CANYONS IN THE COLORADO NATIONAL MONUMENT
Department: Physical & Environmental Sciences
Sponsor: Richard Livaccari

Abstract: The dominant structural features of the Colorado National Monument (CNM) are the NW-SE striking Redlands Monocline and Fault, which are Laramide in age. Movement of the Redlands Fault resulted in differential stress that was high enough to cause tensile failure, forming joint systems in brittle sandstone formations throughout the monocline. It is a common preconception that canyons in CNM have formed from water penetrating joints in the rock, and then exploiting these joints to erode the deep canyons that we see today. The canyons have a dominant northeast to easterly orientation, which is perpendicular to the strike of the Redlands Fault. Joints in the CNM also have a northeast to easterly trend, which suggests that canyons formed along pre-existing joints. Previous investigators have noted the similar orientation of canyons and joints, but work has yet to study their relationship to one another, which is the purpose of this study. Through the compilation of multiple joint and canyon strike measurements, via inspection of aerial photos supported by field measurements, the relationship between canyon and joint orientation can be assessed. This study is applicable to other regions of the Colorado Plateau, where canyon orientations may also be structurally controlled by joints.

Presenter(s)-Major: **Paul DeCock - Theatre Arts-Acting/Directing**
Title: WILLIAM SHAKESPEARE'S "SONNET XXIII"
Department: Theatre
Sponsor: Jeremy Franklin

Abstract: Paul DeCock will be presenting William Shakespeare's "Sonnet XXIII" for this year's Student Showcase. This sonnet is about a young man's final attempt to seduce the woman of his dreams. Paul will also be presenting this and other pieces in this year's Actor's Showcase as part of his capstone project. This Shakespeare piece was selected for its complex language without using material from some of his more recognized plays. Paul also chose this sonnet because he has a strong connection with the line "And in mine own love's strength seems to decay, O'ercharged "with burden of mine own love's might."

Presenter(s)-Major: **Keegan DePriest - Geology**
Title: PETROPHYSICAL PROPERTIES OF THE WANAKAH FORMATION AND SEAL EFFECTIVENESS OF DIFFERENT TYPES OF SHALES
Department: Physical & Environmental Sciences
Sponsor: Sally Potter-McIntyre

Abstract: The Jurassic Wanakah Formation is an important fine-grained seal formation that overlies the porous and permeable, eolian Entrada Sandstone – a proposed carbon capture and sequestration reservoir in western Colorado. Petrophysical properties of the Wanakah Formation are investigated using two end member models, a terrestrial and a marine shale, to evaluate the efficacy of the models as seals for hydrocarbon and CO_2 reservoirs. Petrographic analysis, scanning electron microscope, QEMSCAN, x-ray diffraction, and whole rock analysis are used to evaluate the petrography, mineralogy, and geochemistry to determine lateral variability in terrestrial shales produced by features such as paleosols, bioturbation and diagenetic microenvironments. Petrophysical properties of the Wanakah Formation may be utilized as a guide to predict fluid/rock interactions (for both CO_2 and hydrocarbons) in similar terrestrial seal formations.

Presenter(s)-Major: **Andrew Donabedian - Mathematics-Statistics**
Title: MARKOV CHAINS
Department: Computer Science, Mathematics & Statistics
Sponsor: Richard Ott

Abstract: This project will explain how Markov chains can be used to model real-world situations. The research will discuss common sample models such as birth and death chains, gambler's ruin chains, and the drunkards walk. It will also cover absorbing Markov chains and how to solve them using linear algebra.

Presenter(s)-Major: **Danny Duresky - Mathematics**
Title: PSEUDOPRIMES: A NUMBER THAT WANTS TO BE PRIME
Department: Computer Science, Mathematics & Statistics
Sponsor: Erik Packard

Abstract: Does a composite number that is "almost prime" count for something? On one hand, the great mathematician, Pierre de Fermat, would say no. However, if you were to ask the rest of the math community, they would say yes. These "almost primes" are called pseudoprimes. A particular pseudoprime will satisfy some result that primes satisfy and usually composite numbers do not. There are many different types of pseudoprimes, but the three types that are specifically eye-catching are Fermat pseudoprimes, strong pseudoprimes, and Euler pseudoprimes. There are many similarities and differences between the three types that will be discussed. An interesting discovery that was made is the unique relationship between the three types of pseudoprimes. Therefore, Fermat pseudoprimes, strong pseudoprimes, and Euler pseudoprimes are all related to each other.

Presenter(s)-Major: **Kelly Dwyer - Theatre Arts-Music Theatre**
Title: PERFECT
Department: Theatre
Sponsor: Jeremy Franklin

Abstract: The song "Perfect" from *Edges* by Benj Pasek and Justin Paul shows the tragedy of a young girl ready to completely change herself for a man who does not appreciate her as she is. In college there is a lot of pressure to change for the crowd. When a freshman comes to college there are certain expectations, from movies depicting college as constant partying and casual sex, which creates a lot of pressure on young people to fit in. Since a student is already in a fragile position, when someone comes along who makes someone happy, it can be tempting to do anything at all to make that person stay in your life. The audience intended for this is young men and women in vulnerable situations. The presentation of this song will be with a piano accompanist, Douglas Morrow, with the performer on stage alone to show how the young girl feels. This is an excerpt from a capstone that will be performed on May 4th along with five other songs under the title "Making Faces."

Presenter(s)-Major: **Jessica Earl - Art-Education, Justin Skall - Business Administration-Marketing, Lorena Trujillo - Business Administration-Entrepreneurship, Sarah Wood - Biological Sciences-Biology**
Title: JAPANESE TEA BOWL
Department: Art
Sponsor: Jake Allee

Abstract: In the late sixteenth century, professional Japanese potters began the specialized production of tea ceramics. The Japanese tea bowl soon became a distinctive technique in ceramics and developed a unique character through its distinctive attributes. These exquisite pieces are not to keep in your cupboard like a coffee mug; they are used exclusively for the Japanese tea ceremony. Some are accepted as so beautiful that the Japanese will patch up broken pieces and still consider them a cherished piece of art. While these bowls have countless variations such as yunomi, guinomi, chawan, senchawan, matchawan, and banchawan, they are generally made in two forms. These are either clean and refined or earthy and organic. The two may look and feel like completely different forms; however, they are both equally accepted as beautiful pieces of art.

Presenter(s)-Major: **Justin Edmonds - Pre-engineering, Jean MacPetrie Ogden - Biological Sciences-Biology, Marryssa Russell - Biological Sciences-Biology, Tad Schrader - Exercise Science**
Title: EVALUATION OF POSSIBLE ELECTROCATALYSTS FOR THE REDUCTION OF CARBON DIOXIDE AND/OR PROTONS UTILIZING CYCLIC VOLTAMMETRY
Department: Physical & Environmental Sciences
Sponsor: David Weinberg

Abstract: Problems with storing solar energy efficiently have significantly limited its utilization. We are addressing this issue through the search for inexpensive catalysts that could efficiently combine solar electricity with carbon dioxide and/or protons to generate fuels. These fuels could then be stored and burned for energy as needed. In order to find electrocatalysts that can reduce carbon dioxide and/or protons at relatively positive potentials, we are focusing on inexpensive, solution-phase organic molecules and transition metal complexes that will likely transfer both protons and electrons simultaneously. Possible catalysts are being tested using cyclic voltammetry in both organic and aqueous solutions, and they are being evaluated based on the potentials and currents involved in their reductions of carbon dioxide and/or protons.

Presenter(s)-Major: **Pierce Edney - General Engineering, Alexandra Fieber - Pre-Engineering, Sean Kennedy - General Engineering, Matthew Pitton - General Engineering, Garrett Rodstrom - General Engineering**
Title: KINETIC AND STATIC MOUNTAIN BIKE STRAIN ANALYSIS
Department: Mechanical Engineering
Sponsor: Scott Kessler

Abstract: The purpose of the study is to quantify the strain near the welded joints of a mountain bike frame. The data will be gathered with the use of rosette strain gauges that are welded onto the fame of the bike while the bike is in use. The value of this study is to provide a method of comparing field tested data to data generated by numerical simulation for a mountain bike frame.

Presenter(s)-Major: **Heather Enger - Liberal Arts, Elem Teaching, Kelli Mahan - Liberal Arts, Elem Teaching**
Title: GOLDFISH EXPERIMENT
Department: Teacher Education
Sponsor: Jennifer Daniels

Abstract: This experiment centers on goldfish respiration rates and how water temperature affects those rates. Goldfish "breaths" were counted in numerous trials to come up with averages. The water was cooled, and "breaths" were counted again in numerous trials. The averages of both respiration rates were compared. The research shows that when the water temperature is decreased, goldfish respiration decreases as well.

Presenter(s)-Major: **Michaela Ervin - Computer Science, Ryan Morris - Computer Science, Matthew Puntenney - Computer Science, David Troxel - Computer Science**
Title: EPOCH COMMUNICATION
Department: Computer Science, Mathematics & Statistics
Sponsor: Warren MacEvoy
External Funding: Student Chapter 04061 of the Association of Information Technology Professionals (AITP)

Abstract: The project will utilize the Emotiv Epoch headset. This is a device that rests on one's head and picks up the electrical signals given off by the brain. Software will be written that interacts with this device. It will be focused on allowing disabled people to communicate via a computer. The first iteration software will include a virtual keyboard. The user will control a pointer and 'click' on letters, forming words and sentences. An auto-complete feature will be integrated to allow faster typing. After this initial software is created many other programs will be written, such as art/drawing programs, and an overlay that will allow the user to control all or most aspects of a computer.

Presenter(s)-Major: **Austin Fedewa - Pre-Accounting, Kelsey Hoisington - Accounting-Public Accounting, Holly Nequette - Accounting-Public Accounting, Cassondra Renfro - Pre-Accounting, Elizabeth Ward - Pre-Accounting**
Title: WHAT'S WRONG WITH ACCOUNTANTS?
Department: Business
Sponsor: Suzanne Lay

Abstract: Since Enron and the subsequent initiation of SOX (Sarbanes-Oxley Act), corporate scandals have become a topic of much distaste among accountants. More often than not, the finger is pointed at the accounting field for these enormous failures. But is this necessarily accurate? This research will discuss the difference between business failure and audit failure – commonly misconceived terms that are often confused when discussing fraud. These two terms will be defined and explained further through example of both internal and external failure. Surely accountants are not solely to blame. This study will explore whether ethics courses should be required for more business careers than just accounting, and whether the standards to which accountants are held should be the standard for all business professionals. This study contends that there may be a solution to the ever-constant existence of corporate fraud -- and it may not all be up to the accountants and auditors.

Presenter(s)-Major: **Anthony Fiantaca - General Engineering, Joseph Howerton - General Engineering, Dylan Jones - General Engineering, Benjamin Whitney - Mechanical Engineering Tech**
Title: THE PERFECT STUDENT DESK
Department: Mechanical Engineering
Sponsor: Scott Kessler

Abstract: It has been assumed that college students have been given the proper tools for success. Dormitories have limited space for organization and limited room to work. The ideal student desk would have enough storage space for the materials needed for all classes in a semester, with easy access to everything. It would have a clear organizational system and be comfortable for the student. The desk presented offers the majority of these design features.

Presenter(s)-Major: **Ty Fife - Mass Comm - Media Strategies, Kaitlyn Irick - Mass Comm-Journalism**
Title: SELECTIVE EXPOSURE AND VARYING OPINIONS: HOW PEOPLE'S CHOICE OF NEWS OUTLETS DETERMINES THEIR PERSPECTIVE
Department: Languages, Literature & Mass Communication
Sponsor: Eric Sandstrom

Abstract: Over the years, news coverage has expanded to include diverse television sources, such as FOX and CNN. The presenters will discuss how the advent of different televised news organizations has led to a wide array of viewing options and how those choices have given audiences the opportunity to expose themselves more to certain viewpoints than others. By looking at the methods and information used by these two stations in particular to report the same news events and comparing them to the public's

knowledge of the events, this presentation will illustrate how selective exposure has influenced common knowledge of the news and led to the differences found within televised reporting based on the stations' own viewpoints. It will also reveal the amount of naïveté found in the general public when it comes to knowing the absolute facts of the reported news events. Data for the presentation was gathered by conducting general public surveys, which contained questions about what source people use for news, what they know about a particular event, and if or why they believe their news source is accurate. The presenters will tie back the survey results to previous studies of this topic.

Presenter(s)-Major:	**Brandee Forster - Nursing, Kelli Hawks - Nursing, Nicole Krauss - Nursing, Beth Linderborg - Nursing**
Title:	MENTAL HEALTH NURSE LIAISONS: AN EVIDENCED-BASED PRACTICE IN SUICIDE PREVENTION OF THE ACUTE MENTALLY ILL PATIENT
Department:	Health Sciences
Sponsor:	Genell Stites

Abstract: Suicide is a complex problem that can be linked to one's environment, genetic makeup, psychological makeup, and/or background. Research in mental health and suicide is much more difficult to assess and address than that of medical illnesses such as obesity or asthma. There are many suicide prevention or intervention plans and guidelines in place. This project highlights the current evidenced-based practices being used in nursing to prevent suicide in acute mental health populations. The presenters will consider the ways that mental health communities are providing after care for these patients. The research being implemented in mental health shows the importance of continuous care and follow up, as well as continuity of care with a mental health nurse liaison.

Presenter(s)-Major:	**Andrew Foster - Environmental Science and Tech, Shelby Goodwin - Environmental Science and Tech, Tashina Jasso - Env Sci & Tech-Env Science, Samantha Phillips - Environmental Science and Tech**
Title:	COMPREHENSIVE ANALYSIS OF COLORADO MESA UNIVERSITY'S GREENHOUSE GAS EMISSIONS
Department:	Physical & Environmental Sciences
Sponsor:	Deborah Kennard

Abstract: Evidence argues that increasing levels of anthropogenic greenhouse gases in the atmosphere are influencing the recent shifts in global temperatures causing our prevailing climate change. Because of this, some companies and organizations find it essential to quantify and reduce their emissions. For their senior Environmental Science capstone project, the group conducted an inventory of six specific greenhouse gases ($C0_2$, CH_4, N_2O, HCF, PCF, SF_6) to quantify how much carbon dioxide, or equivalents of other gases (CO_2 equivalent), were emitted during the calendar year 2012 from Colorado Mesa University. The researchers followed the methodology outlined in the General Reporting Protocol by The Climate Registry to calculate CO_2(equivalent). This information will provide CMU with baseline data for future trend analysis and will assist in identifying the sources of greatest emissions, with the goal of determining methods to reduce its carbon footprint.

Presenter(s)-Major:	**Sean Foster - Pre-Business Administration, Alejandra Gonzalez - Pre-Business Administration, Johnny Nitti - Pre-Business Administration, Crystal Turnquist - Business Administration-Entrepreneurship, Sarah Vescio - Business Administration-Management, Shaleen Walz - Liberal Arts, Business Administration, Brian Watson - Liberal Arts, Business Administration**
Title:	INNOVATION AND STUDENT INCUBATOR CENTER
Department:	Business
Sponsor:	Georgann Jouflas

Abstract: The project's goal was to assess the viability of applied learning opportunities at a student-run coffee house and a student incubator. A current trend in higher education is to offer students the opportunity to apply the knowledge and skills they are learning in a student-run business environment. This concept is applied in two ways: 1) business run by students—art galleries, music studios, retail outlets, coffee shops, and pubs—entities owned by the university, but managed by the students; and 2) student-run businesses—businesses owned by students in an incubator environment. To assess the

viability of this concept at Colorado Mesa University, students will be surveyed regarding their interest in earning credits and patronizing a student run operation and participating in a student incubator. Comparable university programs will also be surveyed to discover best practices for operation of such entities. All this information will be used to determine the financial viability of these programs on the CMU campus.

Presenter(s)-Major:	**Erinn Fought - Geology**
Title:	CORRELATION AND AGES OF COLORADO RIVER TERRACES IN THE WESTERN GRAND VALLEY, COLORADO
Department:	Physical & Environmental Sciences
Sponsor:	Andres Aslan
External Funding:	National Science Foundation

Abstract: During the late Cenozoic, incision by the Colorado and Gunnison Rivers has produced a spectacular sequence of fluvial strath terraces that record the tectonic and climatic history of the region. Previous study of the terraces identified multiple terrace levels, but their correlation and ages remain poorly known. This project compiles all existing data and uses new data collected by CMU students to develop a comprehensive inventory of fluvial between Palisade and Grand Junction. This compilation recognizes at least 9 Colorado River terraces that range from 3 to 160 m in elevation above the modern river. Optically stimulated luminescence ages show that the 20 m terrace ranges in age from 63 to 68 ka. The 100 m terrace has a U-series age of 581 +129/-68 ka, which is consistent with the 640 ka age assignment for the 100 m Gunnison River terrace near Delta. Incision rates for the 100 m terrace are 165-173 m/Ma and incision rates for the 20 m terrace are 200-300 m/Ma. Future work will attempt to determine if these differences are related to climate change or due to timescale considerations.

Presenter(s)-Major:	**Kalli Fox - Business Administration-Finance, Nicholas Powell - Pre-Business Administration, Donald Wilson - Pre-Business Administration**
Title:	SOLAR ENERGY INDUSTRY FINANCIAL COMPARISONS
Department:	Business
Sponsor:	Morgan Bridge

Abstract: For this presentation, three solar energy companies were researched and compared in the context of the energy industry. A SWOT analysis as well as an evaluation of financing required to support projected sales and the availability of that required financing will be discussed.

Presenter(s)-Major:	**Mykenzie Fox - Liberal Arts, Elem Teaching**
Title:	TEACHING AS A PROFESSION-- WHAT DRIVES US, WHAT BREAKS US, AND WHAT PREPARES US TO EDUCATE THE YOUTH OF AMERICA
Department:	Teacher Education
Sponsor:	Jennifer Daniels

Abstract: This presentation will consider what it takes to be a GREAT teacher. The presenter has been given the privilege to work in many different classroom settings throughout the last five years. Each of these experiences has left its mark on her teaching. All teachers have their own way of teaching, which is known as their teaching philosophy. These philosophies change every day with every new experience that a teacher has. How a classroom is run depends upon what a particular teacher has deemed acceptable for his/her classroom and what he or she knows will allow students to grow and prosper -- it depends on the philosophy of each teacher. Yet, with such a wide range of teachers, which teachers and which philosophies are deemed as GREAT and why? Within this presentation we will determine the answer to this question. This presentation explores what drives teachers, what breaks (some) teachers, and most of all, what prepares teachers to teach the youth of America.

Presenter(s)-Major: **Karlina Friedlan - Pre-Nurse Allied Health, Kendra Howe - Pre-Nurse Allied Health, Charlotte Martin - Pre- Nurse Allied Health, Garrett Sullivan - Nursing**
Title: TEAMWORK AND COLLABORATION: END OF SHIFT BEDSIDE REPORTING
Department: Health Sciences
Sponsor: Genell Stites

Abstract: This research is centered on the types of shift change reports, and the benefits upon patients' health. Research has shown that the recovery time, patients' safety, and cohesiveness of the medical team is often negatively affected by shift reports. Studies have shown that essential information about the patients' condition, such as allergies, surgical appointments, correct physician information, and care plan, is miscommunicated or altogether left out. A new technique to shift reporting, known as "bedside reporting," has been shown to eliminate many of the possible errors that occur. The presenters examine the pros and cons to bedside shift reports to the standard, and examine where and how this may be applied.

Presenter(s)-Major: **Chandler Frith - Process Systems Technology, William Henline - Chemistry, Dennis Tobin - Process Systems Technology**
Title: HYDROGEN — A FUEL OF THE FUTURE ECONOMY
Department: Western Colorado Community College
Sponsor: John Sluder

Abstract: Increasingly, more nations are looking for abundant and less costly sources of readily available energy. World events, the costs for oil and gasoline, and the movement for a clean environment are making it everyone's business to search for, investigate, and develop alternative energy supplies to meet the global needs. The books *The Possibility of a Hydrogen Economy* by John Smith, *The Hydrogen Economy* by Jeremy Rifken, and *The Hydrogen Economy* by Michael Ball and Martin Wietschel are recent explorations into the future and the potential of an alternative energy source of hydrogen. One of the fundamental pieces is the generation of hydrogen to power this new world, cheaply and abundantly, from the most available source of hydrogen on the planet – water. As we build a new world, not just from solar, wind and nuclear power, hydrogen-generated power will take its place alongside for a bright future of the world and society. This project researches the best possible way to generate the hydrogen from a simple "separator" of hydrogen and oxygen from water by electricity – using the process of hydrolysis.

Presenter(s)-Major: **Sergio Galindo-Enriquez - Mechanical Engineering Tech, Andres Hernandez - Mechanical Engineering, Rebecca Howe - Pre-Engineering, Brandon Howell - Mechanical Engineering**
Title: CONCEALED WALKING ASSISTIVE MACHINE (C-WAM)
Department: Mechanical Engineering
Sponsor: Francisco Castro
External Funding: Eric Skoog

Abstract: Paraplegia is a condition that leaves victims with little or no motor control and/or sensory perception in their lower limbs. People affected by paraplegia suffer from limited mobility, often being relegated to wheel chairs. Assistive devices such as eLEGS, ReWalk, and Rex are modern alternatives to the wheelchair that allow people affected by paraplegia to walk; however, all of these devices cost up to $100,000 and weigh as much as 50 lbs. A patent held by Eric J. Skoog proposes a design for a walking device that can be fully concealed and is operated simply by direct current motors. A group of University of Colorado and Colorado Mesa University engineering students is designing and building an assistive device prototype based on Skoog's patent.

Presenter(s)-Major: **Nathaniel Gallegos - Computer Information Systems**
Title: ESPORTS: A PRODUCT OF DEMAND, AN INFLUENCE OF CULTURAL EVOLUTION
Department: Business
Sponsor: Johnny Snyder

Abstract: eSports (electronic sports), in the most convenient definition, is the competitive play of video games. With eSports gaining popularity around the world, most recently in the United States, there has been an ambiguity in the meaning, direction and analysis of this emerging profession and hobby. Therefore, this paper will define and

analyze the elements that embody eSports. These elements include the market share in which eSports encompasses, intellectual growth with respect to the consequence of playing and studying eSports, as well as the cultural impact that eSports could have on the American society. eSports has already been assimilated into some eastern cultures, most notably South Korea, and as a result this paper will be using the eastern cultures' experiences as a reference and a guide.

Presenter(s)-Major: **Ellen Garcia - Biological Sciences-Biology**
Title: SEQUENCING THE SECRETS OF *SOLANUM*
Department: Biological Sciences
Sponsor: Stephen Stern

Abstract: *Solanum*, from the nightshade family *Solanaceae*, is one of the 10 largest genera of flowering plants, with approximately 1400 species including the tomato (*S. lycopersicum*), eggplant (*S. melongena*), and potato (*S. tuberosum*). The size, diversity, and economic importance of *Solanum* make it ideal for biological study ranging from sequencing the genome of the tomato and potato to recent DNA sequencing identifying the groups within the genus. One of largest major monophyletic groups identified within *Solanum* is the *Leptostemonum* clade, considered the "spiny solanums", with approximately 350-450 species. Within the spiny *solanums*, 14 major clades have been established, but further studies of individual clades are needed to clarify the taxonomy and give evolutionary insight into this "giant genus." One of the 14 clades of *Leptostemonum* is the *Torva* clade. This clade has low phylogenetic resolution and there is very little statistical support for relationships within the clade. In order to clarify the evolutionary relationships within the *Torva* clade, we compared eight gene regions for 35 *Solanum* specimens. DNA sequences were amplified using PCR, sequenced, and aligned. Phylogenetic analysis and preliminary results for the *Torva* clade are presented which clarify the relationships between species and strengthens the phylogeny of *Solanum*.

Presenter(s)-Major: **Walter Gates - Computer Science, David Maier - Computer Science, Carl Nesbit - Computer Science, Edmon Sebit - Computer Science**
Title: STAR KINGDOMS GAME
Department: Computer Science, Mathematics & Statistics
Sponsor: Lori Payne

Abstract: Video Game Design is one of the biggest industries for Computer Science. Star Kingdoms is a slow real-time, tile-based, space-themed, city-management and empire-building strategy game. This game features asynchronous player interaction in a persistent game world for a play experience that evolves as time progresses. This presentation will demonstrate the game, and the use of programming tools to teach game theory and related concepts.

Presenter(s)-Major: **Walter Gates - Computer Science, Josiah Gillispie - Computer Science, Carl Nesbit - Computer Science**
Title: SECURE DISCOVERY DOWNLOADER FOR THE 7TH JUDICIAL DISTRICT
Department: Computer Science, Mathematics & Statistics
Sponsor: Warren MacEvoy

Abstract: When an attorney is working on a case, he or she must go to the District Attorney's (DA) Office and request the evidence and documents, which is known as discovery. This website is a digital system of doing this for the DA's office that will allow the court and private attorneys to download the data through a secure website. This project is built from the ground up to guarantee no backdoors or holes. This is a capstone project for the three students.

Presenter(s)-Major: **Cara Giancaterino - Liberal Arts Pre-Elem Ed, Danielle Sloan - Liberal Arts, Elem Teaching, Nicole Thornton - Liberal Arts Pre-Elem Ed**
Title: INTERACTIVE LAB JOURNALS
Department: Teacher Education
Sponsor: Jennifer Daniels

Abstract: The presenters will describe the use of interactive lab journals as an assessment tool for all ages. Interactive journals are a collection of interactive items

in a binder that collect work to better communicate between teachers, students, administration, and parents. They can be used digitally or tangibly in a science notebook to prepare students for competition in a global society. They help show every stage of learning and evidence for conclusions to soon be found. The interactive notebooks assist students in understanding where they are and organize their work as well as integrate reading, writing, and critical thinking skills.

Presenter(s)-Major: **Justin Grant - Mechanical Engineering Tech, Salvatore Rizzo - Mechanical Engineering**
Title: PRECISION PRESSURE SENSING
Department: Mechanical Engineering
Sponsor: Francisco Castro
External Funding: GPD Global

Abstract: The constant innovation of smaller and more reliable electronics has influenced the electronics industry to strive for accuracy and improvement. GPD Global, a local manufacturer, is looking for ways to increase the accuracy and consistency of their automated micro-volume fluid dispensing process. This process is used to create printed circuit boards for use in many consumer electronics. As electronic devices become smaller, problems with printing accuracy develop. Currently, GPD has discovered that there are inconsistencies in the fluids being dispensed from the nozzle. The purpose of this project was to develop a miniature pressure sensor that could accurately sense the fluid pressure in the fluid dispensing needle. Data from the pressure sensor will be sent to the motor that controls the fluid pump in order to allow the motor controls to perform corrective actions during printing operations. The real challenge of this project was the miniature scale of the fluid dispensing system and the intricacy of the developed sensor.

Presenter(s)-Major: **Kenzie Grant - Kinesiology-Adapted PE**
Title: CASE STUDY: EXERTIONAL HEAT STROKE IN A COLLEGIATE CROSS COUNTRY RUNNER
Department: Kinesiology
Sponsor: Brent Alumbaugh and Gig Leadbetter

Abstract: This is a case study of a 22 year old female Division II varsity cross country runner who was running a hilly, outdoor 6.4 mile course in 96 degree heat at a very low humidity. Six miles into the run the athlete collapsed and became unresponsive. Four minutes later she was put in a stabilized position for breathing. Ten minutes post collapse she was covered in cold wet towels and shaded by her team members. The paramedics arrived 21 minutes post collapse and inserted an IV and transported by helicopter. She arrived at the hospital 45 minutes post collapse with a temperature of 41° C. She was in a comatose state for 5 days. The patient was in ICU for 7 days, remained hospitalized for another 5 days, and readmitted later due to extreme Rhamdomyolisis. Blood tests of liver, kidneys, and CK levels were tested once a week post discharge. Fatigue and weakness was to be expected for an extended period of time post discharge from hospital. This case study provides knowledge of how a specific case was treated, and the post effects of exertional heat stroke in an individual.

Presenter(s)-Major: **Cody Griffith - General Engineering, Marcus Holliday - Pre-Engineering, Benjamin Hunter - General Engineering, Nicholas Jamison - General Engineering, Trevor Potter - Pre-Engineering**
Title: LINEAR ELECTROMAGNETIC ACCELERATOR
Department: Mechanical Engineering
Sponsor: Ruth Powell

Abstract: The purpose of this mechanical engineering project was to create a "rail gun" type device that could safely shoot toy cars or other small metal objects. The rail gun consists of two metal rods sandwiched between plexiglass. The projectile moves down the track as power is applied. An electronic servo controlled the release of energy to the rods, while a heavy duty battery along with capacitors provided the electrical charge. The designers will demonstrate how different voltages affect the flight of a projectile.

Presenter(s)-Major: **Joyce Grinstead - Liberal Arts, Elem Teaching, Belynda Hoffman - Liberal Arts, Elem Teaching, Matthew Meiring - Liberal Arts, Elem Teaching**
Title: VISCOSITY
Department: Teacher Education
Sponsor: Jennifer Daniels

Abstract: This project addressed the question: What is viscosity? In our Methods for Teaching Science and Social Studies class for elementary education, the presenters are exploring STEM research (Science, Technology, Engineering, and Mathematics). This project was motivated by the STEM idea to investigate scientific procedure through an experiment that can be used in future elementary classrooms. This presentation will show the results of the experiment in a form that is similar to an elementary or middle school science fair. The presenters will share hypothesis, research, procedures, and results from the experiment. In the experiment grommets were dropped into water, vegetable oil, honey, and body wash at room temperature, after placing them in the freezer, and after placing the tubes in hot water. The presenters timed how long it took each grommet to get to the bottom of the test tubes and compared the results. This project's original audience is fellow education majors who want to see possible projects to use with their elementary students.

Presenter(s)-Major: **Joyce Grinstead - Liberal Arts, Elem Teaching, Eric Sandoval - History**
Title: WHEN WOMEN LOOK AT MEN: PART 1 OF 3
Department: Social & Behavioral Sciences
Sponsor: Sarah Swedberg

Abstract: Because historically men have been in positions of formal power, the historical record is filled with how men looked at women and how men defined women's roles in society. We know far less about how women looked at men and how women defined men's roles in society. In 1963, John A. Kouwenhoven and Janice Farrar Thaddeus sought to change this through the publication of an anthology entitled *When Women Look at Men.* As a year-long project for the academic year 2012-2013, the students in American women's history courses (HIST 370 and HIST 371) have engaged with updating this anthology for the first time. The students rewrote the introduction to the original anthology to reflect the changes experienced by women in the last half century, and updated the original categories. They hope that through their work, they will help contribute to a published anthology that can be used in history courses throughout the country. The research presents an often ignored and neglected viewpoint. The presenters will emphasize the importance of this project, talk about the process in which they engaged, and detail what they found and learned.

Note: This is part one of a series. See also *WHEN WOMEN LOOK AT MEN*: PART 2 OF 3 and *WHEN WOMEN LOOK AT MEN: PART 3 OF 3*.

Presenter(s)-Major: **Jessica Hartney - Biological Sciences-Biology, Nathan Stevenson - Biological Sciences-Biology**
Title: INVESTIGATIONS INTO A ZOOSPORE LYSING AGENT MADE FROM PETUNIA LATE BLIGHT LESIONS
Department: Biological Sciences
Sponsor: Margot Becktell

Abstract: Late Blight (LB), the infamous disease of the Irish Potato Famine is caused by the plant pathogen *Phytophthora infestans*. LB continues to result in significant losses to potato and tomato crops each year. Compared to potatoes and tomatoes, petunias are less susceptible to LB. Previous and current work on petunia LB shows that infected petunias produce a factor that results in rapid lysis (rupture) of zoospores, a motile infective propagule produced by *P. infestans*. The objective of this research is to determine the identity of the lysing agent. To achieve this goal, susceptible petunias were spray-inoculated with a US-11 isolate of *P. infestans*. After a five day incubation period in a controlled environment chamber, infected petunia leaves were washed in water and the collected rinsate was filtered and tested for the presence of the lysing agent. Addition of 5 µl-10 µl of rinsate to 5 µl of a suspension of healthy zoospores resulted in lysis of zoospores in under 10 minutes. Samples of the rinsate were analyzed via mass spectrometry. Identification of the lysing agent may be one step toward understanding why petunias are less susceptible to this devastating plant disease.

Presenter(s)-Major: **Benjamin Haveman - Geology, Nichole Redden - Geology, Environmental, Clayton Wein - Geology, Environmental**
Title: A PRELIMINARY GEOLOGICAL/GEOPHYSICAL INVESTIGATION OF THE COOK CANYON MAGNETIC HIGH, NW UNCOMPAHGRE UPLIFT, COLORADO
Department: Physical & Environmental Sciences
Sponsor: Verner Johnson

Abstract: In 1979, GeoMetrix performed an aerial magnetic survey in the Moab 1x2 degree quadrangle. Johnson (1983) found and identified a positive magnetic anomaly, one of the strongest anomalies on the Uncompahgre Plateau, as an intrusion in the Coates Creek-Cook Canyon area west of Glade Park in western Colorado. The present study is to determine the precise location of that anomaly using a proton precision magnetometer and GPS units. The study shows the positive magnetic anomaly to be approximately 3300 nT (nanotesla) from high to low. Calculation using Peter's half slope method indicates the magnetic source is approximately 5,400' below the surface. Computer calculation using a cylindrical shape with high susceptibility contrast at .04 and a depth of 5,400' and 11,500' shows the observed and calculated magnetic anomalies are related. This suggests a mafic-type igneous pluton of gabbroic composition may be present. Based on the immediate area's historic igneous activity, the pluton is believed to be Precambrian in age.

Presenter(s)-Major: **Benjamin Haveman - Geology, Nichole Redden - Geology, Environmental, Clayton Wein - Geology, Environmental**
Title: PRELIMINARY GEOLOGICAL INVESTIGATION OF A CATACLASTIC RIDGE ON PINON MESA IN COOK CANYON, UNCOMPAHGRE PLATEAU, WESTERN COLORADO
Department: Physical & Environmental Sciences
Sponsor: Verner Johnson

Abstract: In 1979, GeoMetrix performed an aerial magnetic survey in the Moab 1 X 2 degree quadrangle. In 2012, CMU geology students and faculty performed a magnetic survey of the Coates Creek-Cook Canyon area. A cataclastic ridge that displays a zone of hydrothermal mineralization and alteration was identified on the southwest corner of the research area. The present study is an investigation of the cataclastic ridge to determine its extent, composition and formation using field data compiled using GIS. The study will also attempt to determine the approximate date of silicification, as well as the deposition of the hydrothermal mineral veins found in the area. The length of the cataclast is 465 m and it trends NE-SW. The cataclastic ridge is a zone of silicification in Jurassic Entrada, Kayenta and Wingate Sandstones and may have occurred during the tectonic activity of the Uncompahgre Plateau. This cataclast is similar in mineral composition to other cataclasts found in Cactus Park and Unaweep Canyon. All are believed to have formed by fault movement and hydrothermal activity.

Presenter(s)-Major: **Lane Heinz - Theatre Arts-Music Theatre**
Title: GIANTS IN THE SKY
Department: Theatre
Sponsor: Jeremy Franklin

Abstract: The presentation will be the song "Giants in the Sky" by Stephen Sondheim accompanied on piano by Doug Morrow. This song highlights the modern patter song for the tenor voice and is originally from the show *Into the Woods*. Stephen Sondheim is a lyricist and composer of many works including *Sweeney Todd, Company, Sunday in the Park with George*, and *A Funny Thing Happened on the Way to the Forum*. From the popular tale *Jack and the Beanstalk*, the character Jack sings about his experience with the large than life creatures he encountered while on his journey. This song shows how much has been learned on journey through college, and what will be shown to the world by this young artist. The rest of the performance highlights a passion for life, love and musical theatre. This performance will be in the presenter's capstone project, a cabaret of his own design to be presented May 4th.

Presenter(s)-Major: **Kelly Hill - Mass Comm-Media Strategies, Sarah Rose - Mass Comm-Media Strategies**
Title: BODY IDEALS AND SELECTIVE EXPOSURE
Department: Languages, Literature & Mass Communication
Sponsor: Eric Sandstrom

Abstract: The question this project is attempting to answer is: "Do people seek to achieve an ideal body image based on the exposure they receive, and do they feel satisfied after looking at beauty ads in magazines?" Theory predicts that audiences will typically seek messages that are consistent with their own attitudes and beliefs. This study showed that people make "upward comparisons if achievement seems attainable, but avoid them if it appears unattainable." This presentation will report results of an investigation done by surveying Colorado Mesa University students before and after looking at beauty ads in magazines. The goal of this survey was to see how they felt before and after looking at the ads, and to see if they felt satisfied with their body image the longer they viewed the ads. The presentation will also include a short video of a few students expressing feeling about their bodies and whether they felt the need to improve their bodies after looking at the magazines.

Presenter(s)-Major: **Rachel Hoge - Liberal Arts, Elem Teaching**
Title: TEACHING AS A PROFESSION
Department: Teacher Education
Sponsor: Jennifer Daniels

Abstract: The presenter interviewed three teachers about the profession of teaching. The responses to the questions will be shared in the presentation. Why people teach and what encourages people to teach were some of the topics of the interviews that took place during February 28 – March 4, 2013. Though the interviews were not done in person, the student was still able to become more educated as to what goes on in the education field. The student learned that teaching is all about the learner, and that salary is no factor in the decision to become a teacher. Teaching can be highly stressful, but it is very rewarding by seeing the learners succeed. The presenter therefore concluded that teaching is a selfless profession.

Presenter(s)-Major: **Jeffrey Hrncir - Geology**
Title: THE GREEN RIVER BASIN KIMBERLITIC INDICATOR MINERAL ANOMALY REVISITED: NEW PERSPECTIVES ON MAXIMUM TRANSPORT DISTANCES FOR INDICATOR MINERALS AND AGE OF LAMPROPHYRIC MAGMATISM
Department: Physical & Environmental Sciences
Sponsor: Andres Aslan

Abstract: The Green River Basin (GRB) of southwestern Wyoming is host to one of the largest kimberlitic indicator mineral (KIM) anomalies in North America. The classic KIM's pyrope garnet and Cr-diopside, along with other mantle mineral grains and deep lithospheric xenoliths, are found in stream sediments, harvester ant mounds, pediment gravels and the Bishop Conglomerate over a 2,500-km^2 region. Sedimentologic characteristics govern maximum transport distances and dispersal of KIM grains from host rock sources. For the first time, maximum transport distances are reported for the GRB through stream sediment sampling downstream of the Cedar Mountain lamprophyric diatremes and are compared to data on other kimberlite fields in the Rocky Mountains. Age estimates for the diatremes are proposed utilizing newly recognized age criteria provided by the abundance of Uinta Mountain Group quartzites within the breccia and the presence of deep lithospheric xenoliths and megacrystic KIM grains within Bishop Conglomerate exposures. Despite the graphite stability geochemistry displayed by the KIM grains, the recovery of at least 66 diamonds within the basin justifies continued academic study of the anomaly. Results of this study will aid future exploration in the GRB and separate KIM anomalies found in sedimentary bedrock elsewhere on the Wyoming Craton.

Presenter(s)-Major: **Isaac Hudson - Mechanical Engineering, Timothy Johnson - Mechanical Engineering, Kelsi Middleton - Mechanical Engineering**
Title: DEVELOPMENT AND TESTING OF A WEATHER-PROOF AND SELF-SUSTAINING MOBILE AIR QUALITY SENSING SYSTEM
Department: Mechanical Engineering
Sponsor: Francisco Castro
External Funding: University of Colorado Boulder

Abstract: Natural gas development in the United States has grown dramatically in the last two decades. This growth has created jobs for communities where natural gas is extracted but has also created health risks for the people in the communities. Natural gas burns cleaner than other fossil fuels, but wells can release toxic gases from the ground. In Colorado, natural gas wells can be placed within 150 feet of houses. The communities in areas near natural gas wells can be exposed to hydrogen sulfide and other harmful gases. For this reason, a personal air quality monitoring device is being developed. The University of Colorado Boulder and the University of Michigan have created a U-Pod with help from the National Science Foundation. The U-Pod measures and records concentrations of CO_2, CO, NO_2, O_3 and total VOC. The final product should eventually be distributed to communities affected by oil and gas air pollution. The overall purpose of this project was to make the U-Pod self-sustaining and to implement a weather data recording station. To make the U-Pod self-sustaining, the U-Pod was mounted onto a tripod with a solar panel and 12V batteries to power the U-Pod. The U-Pod was sealed and filtered in order to keep dirt and water out while still allowing gases to be monitored. A basic Matlab code was written that imports the recorded data from the U-Pod and graphs relevant intervals of the data.

Presenter(s)-Major: **Christopher Huisjen - History**
Title: CULTURAL GENOCIDE IN 1947 INDIA
Department: Social & Behavioral Sciences
Sponsor: Vincent Patarino

Abstract: The 1947 Partition of the Indian subcontinent has been a problematic topic for historians. The traditional historical focus has been on political changes fomented by the British, Indian, and Pakistani governments. Few have focused on the actual violence, which is difficult to understand and contextualize due to the reluctance of Hindus, Sikhs, and Muslims to take responsibility for their violent actions, as well as their silent acceptance of events. Several scholars have argued that Partition violence was harder for Indians to contextualize than the Holocaust was for the Germans because while government sponsorship was critical to the Holocaust's perpetration, violence in India was committed by villagers on their neighbors, making it harder to identify, much less to vilify a specific group. Historians such as Gyanendra Pandey, however, have approached the issue of violence during the Partition, looking especially at communalism within individual villages and riots. Using interviews, letters, and fictional accounts produced during the period of the Partition, the presenter will explore both Indian and Pakistani social memories of the violence, demonstrating that a cultural genocide occurred in the Indian subcontinent between 1947 and 1948. This genocide continues to have a major impact on the region, both in the continued animosity between India and Pakistan over Kashmir and as evidenced by the 2008 and 2011 bombings in Mumbai.

Presenter(s)-Major: **Andrew Johnsen - Theatre Arts-Acting/Directing**
Title: PRECIOUS SONS
Department: Theatre
Sponsor: Jeremy Franklin

Abstract: Student Director Andrew Johnsen is presenting a scene from the show *Precious Sons* by George Furth. The show, which features Chris Wells, Sage Buchalter, and Cody Cline, is a dysfunctional family drama based firmly in the struggle between a controlling father and his disobeying sons who are chasing their own dreams. As part of the presenter's capstone project he directed the full-length show *Precious Sons* on April 4th-6th, and will be revisiting a scene to show the public a little bit more about what the Theatre Department teaches in directing as well as acting.

Presenter(s)-Major: **Gregory Johnson - Biological Sciences-Biology, Amanda Stahlke - Biological Sciences-Biology**
Title: AN INVESTIGATION OF THE MOLECULAR IDENTITY OF THE TAMARISK WEEVIL (*CONIATUS*) POPULATIONS USING MITOCHONDRIAL CO1 DNA SEQUENCING
Department: Biological Sciences
Sponsor: Zeynep Ozsoy-Bean

Abstract: The genus *Coniatus* includes 12 species of small sized weevils that are host-specific to the Tamarisk plant. Tamarisk was introduced into Northern America in 1800's as a potential solution to erosion control as well as an ornamental plant and has become a highly invasive species in riparian systems. *Coniatus* species are naturally found in a region encompassing the Mediterranean to the Caucasus and Iraq but are not native to North America. However, since 2006 these weevils have been discovered in Arizona and later in southern California, Southern Utah, Nevada and more recently in the Grand Valley of Colorado. Although *Coniatus* was considered as a biological control agent for Tamarisk it was never officially released due to the efficacy of the Tamarisk biocontrol beetle, *Diorhabda carinulata*. One possibility for their presence could be explained by the import of nursery plants contaminated with *Coniatus*, in which case there could be single or multiple points of origin in the United States. This study aims to determine whether populations of *Coniatus* are genetically different or similar by comparing their CO1 mitochondrial DNA sequence.

Presenter(s)-Major: **Timothy Johnson - Mechanical Engineering, Kelsi Middleton - Mechanical Engineering**
Title: COMPUTER SIMULATION FOR HEAT TRANSFER PROBLEMS IN ENGINEERING
Department: Mechanical Engineering
Sponsor: Farzad Taghaddosi

Abstract: The objective of the project is to demonstrate the use of advanced computer simulation methods for analysis of heat transfer problems for engineering applications. The importance of this approach lies in the fact that such analysis would be very difficult to perform, if not impossible, without using such techniques. The project shows how, for a typical engineering problem, computer simulations can be used to obtain accurate temperature variations at different locations on an object as the time goes by. The simulation involves initial drawing of the geometry using a CAD software, modeling the problem by properly imposing constraints based on initial engineering analysis, solving the problem using a simulation software and finally interpreting the results. It will be demonstrated that the results such obtained will provide valuable information that will help improve the initial design, increase its efficiency, and gain much deeper insight into the physics of the problem. In conclusion, the project aims to demonstrate the importance of using advanced analysis methods based on computer simulation for solving complicated problems in engineering. These state of the art methods ultimately help engineers to design more efficient instrument and machinery, thus making best use of available resources.

Presenter(s)-Major: **Travis Johnson - Environmental Science and Tech**
Title: WHAT'S COMING BACK? MONITORING PLANT COMPOSITION AND TAMARISK MORTALITY IN WESTERN COLORADO
Department: Physical & Environmental Sciences
Sponsor: Deborah Kennard

Abstract: The tamarisk leaf beetle (*Diorhabda carinulata*) was first released in Colorado in 2005. They have become well established in western Colorado and appear to be spreading throughout the lower reaches of the Colorado River watershed. In 2008 the Colorado Department of Agriculture, Palisade Insectary began monitoring the effects of herbivory from the tamarisk leaf beetle at ten sites along the Colorado River and its tributaries in western Colorado. 256 individual trees have been marked and are monitored annually. The declining abundance and vigor of the tamarisk stands at the monitoring sites presented an opportunity to study the successional dynamics of these sites. In 2010, monitoring site level plant species composition at six of the ten sites was initiated. In 2011 monitoring species composition at the tree level began. Plant species composition and cover were similar whether measured at the site or tree level. The most dominant species were non-native weeds. Cheatgrass and Russian knapweed were found to be the most abundant. There does not appear to be a correlation between tamarisk mortality and native plant cover. The health of native plant communities in tamarisk affected areas appears to be more dependent on land use and disturbance than on tamarisk vigor and abundance.

Presenter(s)-Major: **Kristopher Jones - General Engineering, Brian King - General Engineering, Danae Lanigan - Mathematics, Eric Thomas - Pre-Engineering, John Wieseler - Pre-Engineering**
Title: VENTURI INFLATION
Department: Mechanical Engineering
Sponsor: Scott Bevill

Abstract: In order to rapidly inflate devices such as emergency exit slides and rafts, engineers often use inflation devices that utilize the Venturi effect. The purpose of this project was to demonstrate the Venturi effect by showing how air pressure can be *more* effectively used to inflate an object. In order to produce this effect, the diameter of the pressure system was narrowed and a hole was created to increase fluid exit velocity while equalizing exit pressure. The demonstration will involve inflation of an object with and without the Venturi effect and show that when the Venturi effect is used, the volume of the object will increase at a much faster rate. The presenters hope to bring understanding to the concept and facilitate strong interest in fluid mechanics.

Presenter(s)-Major: **Kayla Jubert - Chemistry**
Title: DETECTION OF ULTRATRACE LEVELS OF PERCHLORATE ION IN AQUEOUS SOLUTION BY ION CHROMATOGRAPHY.
Department: Physical & Environmental Sciences
Sponsor: James Ayers

Abstract: Perchlorate is an ion that can be formed both naturally and artificially. However, not much is known about the processes leading to natural perchlorate formation. Although chlorine chemistry in the air was thought to be negligible far from the ocean, recent observations near Boulder, CO showed unexpectedly high levels of chlorine compounds. The effect of these processes on possible perchlorate formation is unknown. The researchers use ion chromatography to study ions that may be formed in natural chemical processes involving chlorine. They have developed a method for analysis of lab samples that can detect perchlorate at levels as low as 0.5 parts per billion. Calibration curves obtained by the method will be presented. The method will allow the researchers to quantify perchlorate at levels that have been observed in the environment.

Presenter(s)-Major: **Elizabeth Kanaly - Mathematics**
Title: FACTORS AFFECTING STUDENT MATH PERFORMANCE
Department: Social & Behavioral Sciences
Sponsor: Saileza Khatiwada

Abstract: The primary purpose of the study is to examine the relationship between students' perceptions of math, socioeconomic status of parents, parents' level of involvement, classroom instructional strategies, and students' math performance. The sample consists of 100 students taking various undergraduate math classes who are currently enrolled (Spring 2013) at Colorado Mesa University. Sampled students were divided into three different groups: prerequisite, intermediate, and upper-level math classes. Responses to survey questions reveal that, in general, there is a relationship between students' perception of math, socioeconomic status of parents, parents' level of involvement, classroom instructional strategies and students' math performance.

Presenter(s)-Major: **Rikki Keiser - Spanish-Teacher Licensure**
Title: POLICARPA SALVARRIETA: THE FACE OF COLOMBIAN WOMEN THROUGHOUT THE INDEPENDENCE MOVEMENT
Department: Languages, Literature & Mass Communication
Sponsor: Mayela Vallejos-Ramírez

Abstract: This is one of five Student Showcase presentations exploring the role of women in Latin America war movements through the lens of Hispanic prose. In the novel *Yo, la pola* by Flo Romero, Policarpa Salvarrieta is a rebellious woman fighting for Columbian independence. This presentation will highlight the major elements of Policarpa's life and consider her contributions to the movement. By assuming the persona of this character, the presenter will examine the role women played in achieving Columbian independence.

Note: This presentation will be given in Spanish.

Presenter(s)-Major: **Barbara Kelsey - Medical Laboratory Technician, Caroline Moravek - Medical Laboratory Technician, Markah Williams - Medical Laboratory Technician**
Title: THE LABORATORY'S ROLE IN FECAL TRANSPLANT
Department: Health Sciences
Sponsor: Angela Silva

Abstract: What's worse than diarrhea? Recurring diarrhea, not to mention abdominal pain and a colon so inflamed it could kill you. An unconventional and rather disturbing treatment for people suffering from *Clostridium* infection is known as fecal transplant. This is transplanting stool from a healthy donor into the gut of a sick patient. *C. difficile* lives in the colon and produces hard-to-kill spores that cause cramps, abdominal pain and severe diarrhea. Every year, an estimated 14,000 to 30,000 people die from the disease. Because its spores are so hardy, they survive on bed sheets, countertops, hospital curtains and other surfaces where people can pick them up months or years later. For many people, *C. difficile* takes over after a round of antibiotics has killed off good micro-organisms, leaving the body with little ammunition to fight the disease. In the laboratory donor blood testing is performed for HIV, hepatitis A, B and C; donor stool testing includes culture, *C. difficile* toxin, ova and parasites, *Giardia* antigen, *Cryptosporidium* antigen and *Helicobacter pylori* antigen. Due to repopulation of the gut with good micro-organisms, fecal transplants have been highly successful with 94% of patient's recovering from their infection with *C. difficile*.

Presenter(s)-Major: **Kari Kimbrow - Psychology-Counseling Psych, Michelle Newhall - Psychology-Counseling Psych, Brittnee Smith - Psychology-Counseling Psych**
Title: RISKY BUSINESS:
SEXUAL SELF-EFFICACY AND TAKING SEXUAL RISKS
Department: Social & Behavioral Sciences
Sponsor: Susan Becker

Abstract: Previous studies have established that sexual self-efficacy is negatively correlated with sexual risk-taking behavior. The majority of these studies focused on failure to use condoms and implications for HIV prevention with limited sample characteristics. The purpose of this study is to examine differences in sexual self-efficacy and sexual risk-taking, as people engage in longer term relationships. Participants who are in longer term relationships are expected to have greater sexual self-efficacy and sexual risk-taking. Men are expected to differ from women by being more likely to take sexual risks even in short-term relationships. We do not expect men's reported risk-taking to differ depending on the duration of their relationships. Participants will complete a survey which includes background questions and 51 Likert scale items. Measures used in this study include modified items from four separate scales on sexual self-esteem, sexual self-efficacy, and sexual risk-taking. Modifications were made to the measures in order to modernize the language and remove repetition. Results will be analyzed using Multivariate Analysis of Variance (MANOVA) where gender, relationship status and duration of relationship will be fixed factors and sexual self-efficacy and sexual risk taking will be the dependent measures. Results will be discussed in the context of social representation theory.

Presenter(s)-Major: **Reanna Kissner - Liberal Arts Pre-Elem Ed**
Title: TEACHING AS A PROFESSION
Department: Teacher Education
Sponsor: Jennifer Daniels

Abstract: Teaching is a profession that is often overlooked and underestimated. Is it possible that teaching is the most important profession in the country? Teachers must acquire specific techniques in order to: manage a classroom, meet standards, be a role model and leader, and to help children learn and grow as individuals. This research focuses on why teaching is one of the most important and influential professions in our country. Teaching is not always easy; there are challenges, but it is essential for teachers to have a support group, be passionate about education, and love to work with children. Teaching is a profession that should not be overlooked or underestimated because it is absolutely essential for the development of our country.

Presenter(s)-Major: **Sunshine Knight - History,**
Beth McBride - Biological Sciences-Biology, History
Title: WHEN WOMEN LOOK AT MEN: PART 2 OF 3
Department: Social & Behavioral Sciences
Sponsor: Sarah Swedberg

Abstract: Because historically men have been in positions of formal power, the historical record is filled with how men looked at women and how men defined women's roles in society. We know far less about how women looked at men and how women defined men's roles in society. In 1963, John A. Kouwenhoven and Janice Farrar Thaddeus sought to change this through the publication of an anthology entitled *When Women Look at Men*. As a year-long project for the academic year 2012-2013, the students in American women's history courses (HIST 370 and HIST 371) have engaged with updating this anthology for the first time. The students rewrote the introduction to the original anthology to reflect the changes experienced by women in the last half century, and updated the original categories. They hope that through their work, they will help contribute to a published anthology that can be used in history courses throughout the country. The research presents an often ignored and neglected viewpoint. The presenters will emphasize the importance of this project, talk about the process in which they engaged, and detail what they found and learned.

Note: This is part two of a series. See also *WHEN WOMEN LOOK AT MEN: PART 1 OF 3* and *WHEN WOMEN LOOK AT MEN: PART 3 OF 3*.

Presenter(s)-Major: **Sunshine Knight - History**
Title: MODERN DAY SLAVERY -
CHILD SEX TRAFFICKING WITHIN THE UNITED STATES
Department: Social & Behavioral Sciences
Sponsor: Erika Jackson

Abstract: According to the FBI's website, 293,000 children are in danger of becoming prostitutes in the United States each year. These are not children "imported" from foreign countries, but Americans. Some are known to have been taken forcefully from their homes, others are coerced, and still others feel that prostitution is the only way to survive on the streets. According to The Denver Post, in January 2012, a prostitution ring based out of the Denver area and consisting of fourteen people was broken up. The ring trafficked girls from Denver to Grand Junction. According to Linda Smith, a United States Congresswoman, there would not be a supply if there was not a demand. This has become an ever-increasing problem within the United States due to the accessibility of various forms of pornography on the internet. Despite these significant issues, there are very few books readily available in regards to the social problems of prostitution and pornography – it takes concerted effort to locate statistics of these crimes and victim testimonies. The researcher plans to write a Young Adult novel to help spread awareness to the girls and boys that are most targeted by the traffickers.

Presenter(s)-Major: **Edward Kobylarz - History**
Title: TO ARM THE SLAVES: RACE IN THE
REVOLUTIONARY ERA LOWER SOUTH
Department: Social & Behavioral Sciences
Sponsor: Justin Liles

Abstract: The American Revolution posed a significant threat to slavery, both directly by the British in a physical sense and on an ideological level as a result of the very core beliefs at the heart of the struggle. John Laurens, son of wealthy plantation owner and esteemed legislator Henry Laurens, opposed the idea of slavery and proposed a plan that would arm slaves and give them freedom for their services. Laurens' plan directly threatened the slave regime, and their response to his plan by blocking its passage helps us to understand racial views in Revolutionary Era South Carolina. The failure of the Laurens Plan demonstrates the gradual shift away from environmentalist views of race and the adherence to a necessary evil pro slavery defense in the Revolutionary Era Lower South.

Presenter(s)-Major: **Rachel Krueger - Theatre Arts-Dance**
Title: HOMAGE TO TED SHAWN
Department: Theatre
Sponsor: Tracey Bonner

Abstract: The legacy of Ted Shawn, "father of American dance" and his male dancers in the 1930's exemplifies a vision of extraordinary magnitude. In 1932, Shawn created America's first company of all-male dancers. His campaign to "establish the legitimacy of dancing for men" was an instant success, despite a prejudice against male dancing at the time. Against all odds, and as a testament to his unprecedented vision, he chose men who had little to no dance training and whose unpolished movements resided narrowly in the repetition of heavy, physical labor. He demanded that men have the "right to choose a career in dance and to be honored and respected." This choreographic work endeavors to honor his philosophic belief in the beauty of "masculine movement." In order to discover the challenges and rewards Shawn faced in working with untrained adults, the four male dancers selected for this demonstration are considered beginners. The presenter hopes to gain insight into Shawn's process of creation and pay homage to his belief that "masculine" energy and form deserve stage presence by approaching the art of dance in a non-traditional manner.
(Dancers: Jake Englemen, Matt LeFriennere, Taylor Newman, and Bryan Carlson.)

Presenter(s)-Major: **AJ Labrum - Theatre Arts-Dance**
Title: MOVEMENT STUDY: PARTNERING
Department: Theatre
Sponsor: Tracey Bonner

Abstract: The ability to create interesting and diverse partnering is monumental in the effort to generate performance works that are divergent from individual body movements. How does one go about creating these phrases? This can be answered through the experimentation of weight sharing, transfer, support, and connections that need be physical and emotional with two or more bodies. This study will further the understanding of these aspects while also allowing the choreographer the opportunity to experiment and set different phrases of work on individual dancers. With the use of three performers one can create a diverse piece that incorporates the different aspects of partnering in different groupings of two and three. (Dancers: Meagan Imbracio, Kayla Bagay, and Kyllie Hiura.)

Presenter(s)-Major: **Ariel Land - Mass Comm-Media Strategies,**
Janie Townes - Mass Comm-Media Strategies
Title: THE DOVE CAMPAIGN FOR REAL BEAUTY
Department: Languages, Literature & Mass Communication
Sponsor: Eric Sandstrom

Abstract: This advertising campaign demonstrates how the Dove brand broadens the definition of beauty, and how the campaign was created to provoke discussion, and encourage debate. The controversy began in 2004, and is still ongoing as of today. The Dove brand puts out advertisements of average looking woman to send the message that girls can be any size and still look beautiful. Societies vision of how woman should look is distorted due to common messages conveyed in the media. Using the Cognitive Dissonance Theory, this project will show the effects on the younger generation to see what their image of beauty really is. Dove is targeting young girls because they want to take preventative measures against a distorted image that is unrealistic and eventually becomes out of control.

Presenter(s)-Major: **Michael Langston - Physics**
Title: MOTION OF A MARBLE ON A WARPED SPANDEX FABRIC
Department: Physical & Environmental Sciences
Sponsor: Chad Middleton

Abstract: In Einstein's theory of General Relativity, gravity is described as the warping of space and time due to the existence of matter and energy. For a spherically-symmetric, non-rotating massive object, this warping of space-time is conceptually equated to a sheet of fabric, held taut, with a ball placed on it. Using a sheet of spandex to model this phenomenon, the exact shape of the fabric is theoretically derived by minimizing the potential energy function for the spandex. This potential energy includes both gravitational and elastic contributions, which arise from the weight of central mass and the "stretchiness" of the fabric. Using Lagrangian dynamics, the motion of a marble

rolling on this elastic surface is found. Focusing on circular orbits, an expression connecting the mass of the central object, the radius of orbit, and the period of motion is found. This expression is similar to that of Kepler's Third Law. Using video analyzing software, the aforementioned physical quantities were measured and the empirical results are found to agree with the theoretical predictions.

Presenter(s)-Major: **Matthew Lescroart - Psychology-Counseling Psych, Sarah Witmer - Psychology-Counseling Psych**
Title: A CASE STUDY ON LEARNING DEFICIENCIES AND EMOTIONAL DISABILITIES
Department: Social & Behavioral Sciences
Sponsor: Daniel Krenzer

Abstract: The importance of empirically supported interventions has come to the forefront of school psychology practice and literature. Discrete Trail Training (DTT) is supported by previous research indicating that it is an effective treatment to teach new or replacement behavior for those having difficulty learning in a traditional manner. DTT is an intervention based on the principals of Applied Behavior Analysis. Benefits of DTT are that these methods can be used to teach an array of skills and can be conducted by parents, teachers, and paraprofessionals. Furthermore, intervention acceptability places emphasis on the balance between complexity of the intervention and the ability of teachers to implement the treatment properly. The purpose of this study is to increase the range of appropriate site word recognition by the use of DTT. Research design for this project is small n or single subject design. The participant in this study is an elementary age student recently found to meet the criteria for dyslexia and ADHD. The dependent variables in this project are the correct responses to early literacy site words and teacher acceptability of the intervention.

Presenter(s)-Major: **Erin Lewis - Nursing, Norma Olivas - Nursing, Rebecca Pena - Nursing, Tayler Young - Pre-Nurse Allied Health**
Title: DIABETES EDUCATION: A PATIENT-CENTERED APPROACH
Department: Health Sciences
Sponsor: Genell Stites

Abstract: Data from the 2011 National Diabetes Fact Sheet, produced by the American Diabetes Association, indicated that 25.8 million people in the United States have diabetes. In 2007 diabetics accounted for $174 billion dollars in healthcare costs. Only 7% of these patients were at their goal for hemoglobin A1c testing, blood pressure, and LDL cholesterol. That means that the remaining 93% of all diabetics were not at goal levels. With today's rising healthcare costs and the challenges that diabetics face on a day-to-day basis, education on how to effectively self-manage the disease is becoming increasingly important. Diabetic patients can be easily overwhelmed by the volume of information required to effectively manage their disease. The patient-centered care approach to providing healthcare operates under the belief that care is respectful and responsive to patient preferences, needs, and values. The patient-centered approach ensures that healthcare provider decisions are based on these factors. This presentation will focus on strategies for nurses to provide education to diabetic patients using a patient-centered approach.

Presenter(s)-Major: **John Loibl - Tech Integr Clust-Network Tech, William Pogany - Tech Integr Clust-Network Tech, Taylor Stratton - Mfg Tech Cluster-Mach Tech**
Title: COMPRESSED NATURAL GAS POWERED VEHICLE
Department: Western Colorado Community College
Sponsor: William McCracken
External Funding: Encana Corporation

Abstract: CNG (compressed natural gas) duel fuel conversion is a system that can be implemented on almost any vehicle. This system allows there to be two different fuel sources which a vehicle can run on, regular gasoline and CNG. This is a significant undertaking for various reasons, the most obvious being the rise in gas prices. But more importantly, gasoline is crucial to the world's economic infrastructure and is in an increasingly limited supply. This makes it imperative to develop an alternative to gasoline, which could possibly be CNG. Transportation is virtually dependent on gasoline and the world dependent on transportation. The presenters hope to successfully install a system that allows a car to run on an alternative resource. This resource needs to be abundant and efficient. Making the switch from gasoline to CNG is a daunting task as

there are few filling stations throughout Colorado. As this system is implemented on more vehicles, a greater demand for CNG filling stations will be created. Even though gasoline is slightly more efficient, CNG is inexpensive and highly abundant. It reduces our dependency on foreign oil, and is a more environmentally-friendly alternative.

Presenter(s)-Major: **Randy Mangel - Computer Science, Abel Sanchez - Computer Science, Samuel Van Pelt - Computer Science**
Title: MY PODIUM
Department: Computer Science, Mathematics & Statistics
Sponsor: Lori Payne

Abstract: The complexity of presentations often lies in the separation of all the tools needed to deliver an informative, successful presentation: the stack of note cards, the presentation slides on a flash drive, and a list of resources scrawled in a notebook. My Podium aims to eliminate the complexity through aggregation. By bringing all these tools together, and even adding a few, the presentation process is simplified and improved, creating a richer experience for the audience and the presenter. My Podium is not a single application. It is a seamless integration of multiple applications. The application will include notes for presentation (in the form of plain text), presentation tools, and an integrated web browser for access to resources in real time. The approach was to acknowledge each of these problems individually and to improve on them as much possible on their own, then use knowledge of user needs and application capabilities to unify them together into a smooth and efficient application.

Presenter(s)-Major: **Veronica Marsh - Theatre Arts-Dance**
Title: CREATIVE MOVEMENT STUDY
Department: Theatre
Sponsor: Tracey Bonner

Abstract: This variable creative movement study will be presenting a dance phrase by exploring how many ways this phrase can be duplicated. Using time, space, energy effort, retrograde, and additional techniques, this phrase will show the possibilities within this movement. The choreographer will accomplish this by incorporating and exploring variable tools from the Laban movement within the 27 points in space. What makes this dance movement different from others is the use of the same phrase repeated differently to create many possible outcomes. By exploring and creating we can see that the changes are infinite. The members of the dance phrase are senior dance major Gabbie Cahill and freshman dance major Vicky Stone. The duo formed this semester out of their willingness to explore movement. The audience will visually experience separate movement from both of them as well as combined movement. (Dancers: Gabbie Cahill and Vicky Stone.)

Presenter(s)-Major: **Julie Martinez - Nursing, Racinda Mitchell - Nursing, Lisa Pille - Nursing, AnnMarie Schans - Nursing**
Title: ALTERNATIVE MEDICINE:
INCREASING THE EFFECTIVENESS OF PATIENT CARE
Department: Health Sciences
Sponsor: Genell Stites

Abstract: Alternative medicine is an approach designed to prevent health problems rather than treat the later symptoms. Covering a broad range of therapies and treatments, it takes into consideration the whole person, including his or her physical, mental, emotional, and spiritual condition. As individuals strive to take more control over their own health care, and explore options besides drugs and surgery, interest towards alternative methods continue to grow. Also referred to as complementary medicine, a shift in personal and professional attitudes suggests that rather than a substitution for conventional medicine, the alternative medicine is used along with conventional medicine. Although alternative medicine is limitless in what it offers, areas of focus include the use of acupuncture, chiropractic, herbs, massage, yoga, psychotherapy, hypnotherapy, reading for the mind, meditation for the spirit, diet and exercise for an overall healthy lifestyle. This research will show how conventional and alternative medicine work together to benefit clients.

Presenter(s)-Major: **Beth McBride - Biological Sciences-Biology, History**
Title: THE EFFECTS OF CLIMATE CHANGE ON THE BREEDING BEHAVIOR OF TREE SWALLOWS AND VIOLET-GREEN SWALLOWS IN WESTERN COLORADO
Department: Biological Sciences
Sponsor: Susan Longest

Abstract: Global climate change is an important area of study due its widespread effects on environmental conditions and the animals dependent upon them. Increased temperatures cause insects to hatch earlier in the season, affecting the migration timing for many bird species. This study uses long-term data to address the effects of climate change on the breeding behavior of birds in the genus *Tachycineta*, which includes tree swallows and violet-green swallows. Using historical data collected during the Grand Valley Audubon's Spring Migratory Bird Count, the researcher analyzed the effects of climate change on the number of tree swallows and violet-green swallows breeding in western Colorado from 1993-2012. Data from the past 10 years was used to determine if breeding habitat preference has changed for either species in relation to climate change. These results provide a baseline to assess whether climate change has impacted these local species over the past 20 years. Further, these data are coupled with behavioral data the researcher has been collecting on these species since last summer. Long-term data on the breeding behavior of birds is needed to determine the effects of climate change on different species, which will also be important in conservation efforts to help preserve these species.

Presenter(s)-Major: **Tabathia McBride - Pre-Nurse Allied Health, Laretha Palmer - Nursing, Jennifer Piatt - Nursing, Kathleen Zimdars - Nursing**
Title: TOXIC CHEMICALS AND THE HEALTHCARE WORKER
Department: Health Sciences
Sponsor: Genell Stites

Abstract: This study focuses on toxic chemicals used to kill various bacteria and viruses in a healthcare setting, with a focus on the Super Sani-Cloth. This product is a bactericidal, tuberculocidal, virucidal wipe that kills HIV, hepatitis B and C viruses and is commonly used in many hospital and healthcare settings, including critical care areas. Although this product is toxic and the packaging states it is "harmful if absorbed through the skin "and that "suitable protection (e.g. gloves) should be worn when dispensing and using this product," it is commonly used by healthcare workers without protection of any kind. This project will examine the long term consequences of contact of the active ingredients, dimethyl ethylbenzyl ammonium chlorides and dimethyl benzyl ammonium chlorides, on bare skin and education of healthcare workers on the importance of wearing gloves while using it.

Presenter(s)-Major: **Ryan McConnell - Environmental Science and Tech, James Ross - Pre-Business Administration, Kristopher Scoggins - Process Systems Technology, Amanda Stahlke - Biological Sciences-Biology**
Title: SUSTAINABILITY PROJECT
Department: Business
Sponsor: Georgann Jouflas

Abstract: The project's goal was to determine the feasibility of composting the pre- and post- consumer food waste from the Sodexho food service operation on the Colorado Mesa University Campus. With a number of LEADS certified buildings on its campus, Colorado Mesa University is developing a reputation for incorporating sustainability in its operations. The next step is to reduce the waste produced in the on-campus food service operations. This problem is being studied with a team from multiple disciplines: Business, Environmental Science, Biology, Manufacturing Technology and Culinary Arts. Using the this diverse knowledge base, an implementation plan for Sodexho and Colorado Mesa University will be developed that incorporates financial viability and maximum learning opportunities.

Presenter(s)-Major: **Tamra McNeil - Pre-Nurse Allied Health, Meghan Mogck - Nursing, Karley Prine - Pre-Nurse Allied Health, Stephanie Seiler - Pre-Nurse Allied Health**
Title: HEALTHCARE ACQUIRED INFECTION PREVENTION
Department: Health Sciences
Sponsor: Genell Stites

Abstract: Stethoscopes come in contact with numerous patients during a healthcare provider's shift; and just like hand washing, these instruments should be cleaned between each patient contact. Stethoscopes provide a vector for bacteria to travel from patient to patient in the healthcare setting, spreading viruses and bacteria such as the common cold, the Influenza virus, or drug resistant strains such as MRSA or VRE. Using a solution containing 70% or greater isopropyl alcohol is the best way to clean a stethoscope between contacts to eliminate these microorganisms. The Centers for Disease Control and Prevention (CDC) reports that approximately 1 out of every 20 hospitalized patients will contract a healthcare acquired infection in the United States. Many studies have been conducted which show that cleaning the bell and diaphragm of a stethoscope between patients significantly reduces the amount of bacteria colonized on these surfaces. The study will show the difference in bacterial growth on a typical healthcare provider's stethoscope 48 hours after patient contact with and without complete sanitizing. The study will also look at the effectiveness of using a 70% isopropyl alcohol swab versus a gel based hand sanitizer in eliminating bacteria.

Presenter(s)-Major: **Aura Medrano - Liberal Arts, Elem Teaching**
Title: KINESTHETIC LEARNING
Department: Teacher Education
Sponsor: Jennifer Daniels

Abstract: The purpose of this study is to determine the effects that kinesthetic lessons have on student learning. There are three different learning styles: visual, auditory, and kinesthetic. Research has shown that kinesthetic students learn best when they are given the opportunity to move around and be active. This experiment questioned whether or not kinesthetic learning was effective. The experiment took place in a fourth grade classroom. Students were comparing the sizes of oceans and continents, while tossing a globe to one another. After the lesson had been taught, students were anxious to share results with anyone they came in contact with. The results from the experiment conclude that lessons must be differentiated in order to meet the learning styles of all students.

Presenter(s)-Major: **Breanna Meininger - Psychology, Misske Tjandra - Psychology-Counseling Psych, Tiffany Waugh - Psychology**
Title: EFFECTS OF ACCULTURATION ON INTERNATIONAL UNDERGRADUATE STUDENTS
Department: Social & Behavioral Sciences
Sponsor: Nikki Jones

Abstract: Acculturation affects every international student in different ways while in the U.S. Research indicates that 1) English proficiency is positively related to social interaction with American students; 2) gender shows no significant effect on acculturation; and 3) a positive relationship exists between adjustment and length of stay in the U.S. Additionally, the greater the cultural differences between international students and the host culture the more isolation is reported. However, it must be noted that such research is usually conducted on graduate students, who have a qualitatively different experience than undergraduate students. Therefore, the aim of this study was to explore if undergraduate students have the same struggles in acculturating. Based on this information, the following were the hypotheses for the current study: The more isolated international students are, the less acculturated they will be. International students who stay in the U.S. longer will become more acculturated. Gender differences on level of acculturation and isolation will be found. The more fluent international students are in English, the more acculturated they will be. The results will be revealed and explanations for the results will be discussed.

Presenter(s)-Major: **Jonathan Mellor - Computer Science, Luke Moses - Computer Science**
Title: HELPING THE DISABLED THROUGH AUTOMATION
Department: Computer Science, Mathematics & Statistics
Sponsor: Warren MacEvoy

Abstract: Living with a disability is tough; tasks that other people take for granted can be very difficult. To help assist the blind or those with other impairments, this project uses voice control in smartphones and a website to control and monitor various aspects of a person's home. The system can turn power sockets on or off to control lighting or other devices, check status of doors and windows, and assist in cooking and other daily tasks. Sensors communicate over the wireless network that most households already have in place.

Presenter(s)-Major: **Jonathan Mellor - Computer Science, Luke Moses - Computer Science, Eric Wilcox - Computer Science**
Title: ADAPTABLE ROBOT BRAIN
Department: Computer Science, Mathematics & Statistics
Sponsor: Warren MacEvoy

Abstract: When building robots, it is easy to focus on one particular design. This approach leaves a number of possibilities out when they could be easily included. The idea of this project is to create a "brain" that can be used with a variety of designs. This "brain" could be loaded into Arduino based hardware with various modules that can be turned on and off as needed. This creates a base layer code that future designs can be based upon using the Arduino controller model.

Presenter(s)-Major: **Catherine Melorango - History, Pre-Teacher Ed**
Title: SOUTHERN WOMEN'S JOURNEY INTO THE HOME
Department: Social & Behavioral Sciences
Sponsor: Justin Liles

Abstract: During the colonial period, the South was a conglomerate of several different societies that did not have a collective, sectional identity. The shift towards sectionalism, beginning in the 1820s, along with the massive cotton boom in the Southern states, led to a strengthening of the slave regime during the antebellum period that impacted family life. The stratification that resulted from the paternalism inherent in the slave system in Southern society hindered women's ability to actively participate in public economic affairs and planted them in the home. As the rigid slave regime continued to strengthen, lines between gender roles became more rigid and both sexes expected women to fill their societal role as the "subordinate" supporter of men by practicing hospitality and domesticity.

Presenter(s)-Major: **Michael Meyer - Kinesiology-Teaching (K-12)**
Title: PREPARING TO BE A PROFESSIONAL
Department: Kinesiology
Sponsor: Elizabeth Sharp

Abstract: In the college setting, students acquire knowledge to perform the duties of their future careers; however, knowledge without experience is devalued in the professional world. This poster describes the experiences of Colorado Mesa University students pursuing degrees in Kinesiology. Information was collected about students' learning experiences and the connection to professional development. The presenter conducted interviews with professional organization members regarding their career paths and their experiences as future professionals. Professional development opportunities for students outside of the school curriculum and their involvement in professional organizations will be discussed. This project illustrates the importance of professional development and outlines the benefits and opportunities that come from involvement in professional organizations.

Presenter(s)-Major: **Julie Miller - Pre-Accounting, Scott Rust - Accounting-Public Accounting, Jesse Stone - Pre-Accounting**
Title: LIFE AFTER WHISTLEBLOWING
Department: Business
Sponsor: Suzanne Lay

Abstract: The act of blowing the whistle on unethical business behavior may seem to be a heroic endeavor, but research and analysis of past whistleblower cases suggests

otherwise. What do whistleblowers experience after the fact? Statistics show that blowing the whistle on unethical business behavior leads to adverse physical and mental health effects, in most cases. After the group members read *Extraordinary Circumstances: The Journey of a Corporate Whistleblower*, by Cynthia Cooper, they theorized that life after blowing the whistle is complicated, with further research providing depressing proof of the latter. The group's research will show that blowing the whistle has serious personal repercussions. An understanding of ethics and business principles may be needed to fully grasp the magnitude of the proposed topic.

Presenter(s)-Major:	**Roger Miller - Geology**
Title:	A PRELIMINARY ANALYSIS OF LATE PLEISTOCENE PALYNOMORPHS IN LAKE BEDS FROM CACTUS PARK, COLORADO
Department:	Physical & Environmental Sciences
Sponsor:	Andres Aslan
External Funding:	National Science Foundation and Grand Junction Geological Society

Abstract: The identification and classification of fossil pollen found at various depths in drill cores from Cactus Park, Colorado allows the depositional history of late Pleistocene lake beds to be more tightly constrained, possibly bolstering the evidence for a two-stage abandonment of nearby Unaweep Canyon by the ancient Colorado and Gunnison Rivers. The rhythmic, interbedded silts and clays making up the ancient Cactus Park lake beds contain many examples of pollen that range in age from ~1.05 Ma to ~0.64 Ma, as bracketed by cosmogenic burial ages on ancient Gunnison River gravels, and the nearby presence of the Lava Creek B tephra. Older Cenozoic palynomorphs may be present, and their identification would indicate re-working into the lake beds. The presence of older pollen separated stratigraphically from younger pollen could lead to better understanding of the history of river abandonment in Unaweep Canyon. Microscopic analysis of thin-sections from the Cactus Park cores, along with correlation to known palynomorphs, will lead to greater understanding of the types of pollen found there, and subsequently greater understanding of the geomorphological and perhaps paleoclimatological history of Unaweep Canyon.

Presenter(s)-Major:	**Cassidie Mims - Exercise Science, Shane Niksic - Exercise Science, Samuel Phillips - Exercise Science**
Title:	PRE-COOLING WITH AN ICE SLUSH DRINK: EFFECT ON CORE TEMPERATURE WHEN CYCLING
Department:	Kinesiology
Sponsor:	Gerald Smith

Abstract: Pre-cooling has been shown to enhance performance of athletes by reducing core body temperature or delaying the onset of core heating during training or competition. Previous research has focused on pre-cooling using ice vests, frozen towels, ice baths and other methods. The purpose of this study was to determine the effect of ingesting an ice slush drink on reducing core temperature (CT) prior to intense cycling in a heated environment of 26.7° to 27.8° C. Two elite male cyclists from the CMU cycling team performed two separate trials on a cycle ergometer consisting of a 15 minute warm up followed by 30 minutes at 80% of their pre-determined anaerobic threshold power (AT). During a 15 minute warm up phase, either the ice slush drink or cool liquid were ingested at a controlled rate. Throughout the trials, CT data was collected using the HQ Inc. CorTemp ingestible pill and a data recorder. Heart rate and rate of perceived exertion (RPE) were also recorded. With pre-cooling, CT data showed a decrease of approximately 0.5° C. Ice slush trials showed a decrease in CT when compared to the cool liquid trials, resulting in a delay of CT heating.

Presenter(s)-Major:	**Robert Mitchell - English-Writing**
Title:	THE HISTORICAL FACTORS LEADING UP TO CHIEF JUSTICE ROGER TANEY'S COURT DECISION ON THE DRED SCOTT DECISION
Department:	Languages, Literature & Mass Communication
Sponsor:	Barry Laga

Abstract: In 1857, the Supreme Court passed judgment on the case of Dred Scott v Sanford, which would famously become known as 'The Dred Scott Decision.' The Supreme Court's verdict in the Dred Scott Decision was a pivotal moment in U.S. history, and the court opinion on the case published by Chief Justice Roger Taney is considered by many to have been the proverbial 'straw that broke the camel's back' related to

tension over slave ownership, and this led to the bloodiest conflict in American history. The presenter will provide an analysis of Chief Justice Taney's opinion as well as briefly explore the historical context leading up to the case and to the publishing of the highly controversial court opinion.

Presenter(s)-Major: **Airi Miyamoto - Music-Performance, Sandra Rivera-Ventura - Music-Education, Tania Sermeño-Rivas - Music Performance**
Title: AN INTERNATIONAL PERSPECTIVE OF STRING MUSIC PROGRAMS
Department: Music
Sponsor: Carlos Elías

Abstract: The presenters will analyze and compare music programs from different countries that they have had the opportunity to be part of. They will share their own experiences as well as present interviews they have collected from various international musicians. These interviews and experiences will cover topics on string pedagogy methods, practice routines, and musical repertoire.

Presenter(s)-Major: **Tyler Mundy - Business Admin-Finance, Caitlin O'Brien - Business Admin-Finance, Jacquelyn Ramsey - Business Admin-Marketing, Sarah Simms - Business Admin-Finance, Jessica Templeton-Lynch - Business Admin-Finance, Codie Van Treese - Business Admin-Finance**
Title: A FINANCIAL BREAKDOWN OF THE CASINO AND GAMING INDUSTRY
Department: Business
Sponsor: Morgan Bridge

Abstract: The current financial situations of some of the biggest and most well-known names in the Casino and Gaming industry were examined. Using financial analysis, ratio analysis, and forecasting tools where they have been, where they are, and where they could go in the future will be discussed.

Presenter(s)-Major: **Nathaniel Nelson - Mathematics-Statistics**
Title: IS KOBE BRYANT A ONE MAN TEAM?
Department: Computer Science, Mathematics & Statistics
Sponsor: Richard Ott

Abstract: In the National Basketball Association there has been a lot of talk about who is the best player in the history of the league. Three players that are consistently discussed are Michael Jordan, Kobe Bryant and LeBron James. Each player has been given the recognition as a "one-man" team. The purpose of this research project is to examine Kobe Bryant's statistics and determine if he can be considered a one-man team. Logistic Regression and other statistical methods were used to investigate the one-man team accusation.

Presenter(s)-Major: **Skyler Nelson - Env Sci & Tech-Env Science**
Title: VEGETATION MAPPING, WATER QUALITY, AND GROUND WATER MONITORING AT A WETLAND RESTORATION PROJECT AREA IN GRAND JUNCTION, CO
Department: Physical & Environmental Sciences
Sponsor: Gigi Richard

Abstract: A pond, located on 23 ¼ Road and Redlands Parkway in Grand Junction, CO, is the subject of wetland reclamation in order to achieve credit in the wetland mitigation bank for Mesa County. This pond was historically mined for gravel and is now undergoing various processes to restore the area to a wetlands marsh, adjacent to the Colorado River. This study will examine the water quality (conductivity, pH, and dissolved oxygen) of the pond as compared to the ground water and the river, in order to help direct the necessary changes that must occur for a wetlands to be achieved. The vegetation will be surveyed using a GPS unit, differentiating between the invasive species (Tamarisk specifically), wetland, facultative, and upland species and their location in respect to the surface water of the pond. The findings of this study will allow for a recommendation to Mesa County in regards to the wetland reclamation project of the project and better direct the efforts put into the pond.

Presenter(s)-Major: **Thomas Nelson - Pre-Business Administration**
Title: COURSE LEARNING OUTCOMES DATABASE
Department: Business
Sponsor: Gayla Jo Slauson

Abstract: This presentation is of a database application for MS Access for the purpose of storing information about course, institutional and department learning objectives to the classes and catalog descriptions to which they apply. The database will be populated and tested using CISB class descriptions and learning outcomes, but will be extensible to other departments. The database will be used by instructors to manage course outcomes and help to ensure that assignments meet objectives at all levels, and to aid students in choosing courses that align with their educational goals. The database application will contain user input forms to provide an easy means of updating learning outcomes, adding information for other departments, and other relevant information contained in the database, as well as report objects to display and summarize the database's information content.

Presenter(s)-Major: **Tyler Nelson - Mathematics-Statistics**
Title: UNIFYING THE DEFINITIONS OF EXPECTED VALUE THROUGH MEASURE THEORY
Department: Computer Science, Mathematics & Statistics
Sponsor: Markus Reitenbach

Abstract: When it comes to analyzing data the expected value is one of the most essential and quickest ways to understand exactly what is going on with the numbers presented in the data. This project takes a closer look at the two different definitions of expected value dealing with continuous and discrete data and unify the two definitions using measure theory.

Presenter(s)-Major: **Douglas Nichols - Geology**
Title: EVIDENCE FOR POST-LARAMIDE UPLIFT OF THE FLAT TOPS AND PARK RANGE, NORTH-CENTRAL COLORADO
Department: Physical & Environmental Sciences
Sponsor: Andres Aslan
External Funding: National Science Foundation

Abstract: Post-Laramide uplift of the Rockies is poorly understood in terms of both timing and uplift mechanisms. Field studies in the Flat Tops and Park Range of Colorado included sampling basalt flows and sandstones of the Miocene Browns Park Formation. Observations include anomalous drainage patterns in the southern Park Range that suggest a post-Laramide reversal of drainage direction. Field observations of the Browns Park Formation at Pyramid Peak in the Flat Tops provide additional evidence for post-Laramide tectonism. Pyramid Peak is represented by basaltic lava flows and poorly cemented, coarse sandstone with conglomeratic lenses. Granite fragments in the sandstone were derived from the Park Range ~30 km to the east. However, granitic outcrops today in the Park Range are at lower elevations (<3250 m) than the elevation of the granitic sandstone (3455 m). Collectively these observations indicate that the Flat Tops have risen relative to the Park Range, and that the Park Range has collapsed along its western flank. The timing of these events is constrained by detrital zircon data for the granite-rich conglomeratic lenses at Pyramid Peak and basalt flow age dates at Lone Spring Butte. Post-Laramide tectonism occurred between 23 and 6 Ma, possibly due to mantle-driven uplift.

Presenter(s)-Major: **Mara Nielsen - Spanish-Applied Professional**
Title: LEONA VICARIO: LA MADRE DEL PROCESO INDEPENDISTA DE MÉXICO
Department: Languages, Literature & Mass Communication
Sponsor: Mayela Vallejos-Ramírez

Abstract: This is one of five Student Showcase presentations exploring the role of women in Latin American war movements through the lens of Hispanic prose. The presenter will reexamine the Mexican Independence movement by assuming the persona of Leona Vicario, as portrayed in the historical novel *Leona* by Celia del Palacio. Leona Vicario dedicated her life and fortune to the fight to end Spanish colonialism. Through this character's eyes, the presenter will recover the memory of the contributions she made to the independence process in Mexico.

Note: This presentation will be given in Spanish.

Presenter(s)-Major: **Kyle Parker - Computer Science, Sophat Sem - Computer Science, Dirk Terpstra - Physics**
Title: PRODUCT INVENTORY MANAGEMENT PROGRAM
Department: Computer Science, Mathematics & Statistics
Sponsor: Lori Payne

Abstract: Managing inventory can be one of the most important functions of a company. Pen, paper and calculators can only do so much. This Delphi program takes aspects of managing inventory and focuses them to create an application a small business can use to help keep track of numerous amounts of inventory. This application allows users to be able to do basic inventory tasks, such as placing orders, sorting, adding, and deleting inventory items. In addition, the application will be capable of producing sales reports, and will include a basic notification system. A retail store, small restaurant, or bar could easily use this application to manage their inventory. Specifically, the program is able to manage an inventory from reading in user friendly data files. The user is also able to update the inventory manually by searching and editing individual items. This software can also produce charts and graphs of what items are in stock, and what items are the best or the worst sellers. When items are low in inventory, the program will produce a notification to the user to order more stock. This notification can be set to show daily, weekly, or monthly.

Presenter(s)-Major: **Michael Partlow - Biological Sciences-Biology**
Title: COMPARING OPEN SOURCE TO COMMERCIAL GIS PROGRAMS FOR MAPPING CHRISTMAS BIRD COUNT DATA
Department: Biological Sciences
Sponsor: Susan Longest

Abstract: The Audubon Society's annual Christmas Bird Count (CBC) is one of the largest citizen science initiatives in the world. The CBC is divided into local circles each 24 kilometers in diameter and manned by a group of volunteers who census birds within the circle. A panel that was convened to improve the scientific value of the CBC recommended, among other things, the mapping and standardization of routes within CBC circles. Geographical information systems (GIS) could be used to generate standardized routes and to analyze CBC data within individual circles, making data within individual circles more useful for studies of localized species distribution. ESRI's program, ArcGIS, is widely used by researchers and government agencies, but the high price could be prohibitive for applications such as the CBC. Quantum GIS is a free and fully functional application that could provide an alternative to commercial software. The goals of this project are to map the locations of western screech-owl nest boxes established by the Grand Valley Audubon Society and compare the strengths and weaknesses of Quantum GIS, ArcGIS, and web-based applications, such as Google Earth. Non-profit or volunteer-based researchers can utilize this information to choose software to analyze different biological and ecological datasets.

Presenter(s)-Major: **Jazmyn Phillips - Theatre Arts-Dance**
Title: THE ANATOMICAL INFLUENCE
Department: Theatre
Sponsor: Tracey Bonner

Abstract: The training of dance is formal, studied in a group setting. Dancers are told to perform as one body and expected to provide an image of synchronization. Through extensive rehearsal, the dancers are hopefully able to achieve a matched quality of movement. However, when a dancer initially begins to learn a choreographic statement, his or her individual body dictates the method of execution for each position. No two individuals have exactly the same bone and muscle structure; therefore, no two people will go through the same process to execute the given choreography. As a student of dance movement, the presenter is interested in a body's potential range of motion, including the influence of the anatomical build of a body. How does a dancer's anatomical structure influence the choices he or she makes when executing choreography? This performed movement exploration will demonstrate four individuals with varying body structures and unique movement qualities. The research will show the same choreography performed by each dancer with the purpose of recognizing subtle differences in the way the dancers execute the movement according to their individual anatomy. (Dancers: Korey Van Hoy, AJ Labrum, Lindsay Heck, and Justin Keats.)

Presenter(s)-Major: **Elizabeth Picazo - Spanish-Applied Professional**
Title: THE MEXICAN REVOLUTION IN *COMO AQUA PARA CHOCOLATE*
Department: Languages, Literature & Mass Communication
Sponsor: Mayela Vallejos-Ramírez

Abstract: This is one of five Student Showcase presentations exploring the role of women in Latin American war movements through the lens of Hispanic prose. In the novel *Como aqua para chocolate* by Laura Esquivel, the Mexican Revolution is the backdrop to the lives of the main female characters. The presenter will assume the personality of the main character, Tita, and explore several aspects of the Mexican Revolution and the effect it had on Tita, her sister Gertrudis, her mother Elena, and the maid Chencha.

Note: This presentation will be given in Spanish.

Presenter(s)-Major: **Grayson Pipher - Liberal Arts, Elem Teaching**
Title: TEACHING AS A PROFESSION
Department: Teacher Education
Sponsor: Jennifer Daniels

Abstract: This presentation will include interview-based research acquired from both retired and current teachers. The information provided will cover the basic questions of 1) why did the interviewees choose to become teachers 2) why they chose to either retire or continue teaching 3) why do most teachers become leaders , and 4) a variety of other questions based on the specific teacher being interviewed. This research will show various reasons why people become teachers and the different challenges teachers face such as student communication disorders, teaching special needs children, and the common problems teachers see in an everyday classroom. It will give a little insight on what it takes to be a teacher and why the profession is so important in our society.

Presenter(s)-Major: **Carmen Ponce - Mathematics**
Title: PERIODS OF RECURSIVELY DEFINED SEQUENCES
Department: Computer Science, Mathematics & Statistics
Sponsor: Phil Kavanagh

Abstract: The Fibonacci sequence is one of the most recognized recursively defined sequences. When using modular arithmetic on the Fibonacci sequence, interesting properties are exposed, including the fact that the Fibonacci sequence under modular arithmetic is periodic. In this presentation we will discuss the possible values for the period of the Fibonacci sequence modulo a prime. Additionally, we will discuss the construction of splitting fields to obtain upper bounds for periods of recursively defined sequences modulo primes.

Presenter(s)-Major: **James R. Rice – Geology**
Title: USING GIS TO FORM AN ARCHAEOLOGICAL PREDICTIVE MODEL: CACTUS PARK TEST CASE
Sponsor: Verner Johnson

Abstract: Archaeological predictive models are a commonly used tool to control the amount of field time, labor, and thus expense in the collection and recordation of cultural data. When field survey, and possibly excavation, become necessary due to an impending impact activity, concentrating efforts on likely locations of cultural remains can reduce search time and record more data. Such models use understanding of settlement and subsistence patterns to predict not only where to look, but also what types of cultural remains for which to look. Many predictive models exist, and GIS has been used in their construction for many years. The purpose of this project is twofold. First, it sought to produce a predictive model using ESRI ArcGIS software that was specifically focused on the northern Colorado Plateau and the subsistence and settlement patterns used there prehistorically. The second part of the project's purpose was to select a geographical area with well-documented cultural remains, apply the predictive model, and thus test the effectiveness of its predictions against real data. ArcMap and ArcScene were employed to create and overlay various rasters with the intent of discerning areas with the most desirable attributes. The list of attributes and their relative frequency was compiled according to assumptions about human behavior and ecology, human response to and interaction with their environment and availability of resources.

Presenter(s)-Major: **Christina Reed - Mathematics, Eric Sisneros - Computer Science, Brian VandeBoogaard - Computer Science**
Title: COLOR YOUR WORLD WITH EASE!
Department: Computer Science, Mathematics & Statistics
Sponsor: Warren MacEvoy

Abstract: Have you ever wanted to get an estimate to have your house painted? Tired of calling local businesses for estimates and waiting patiently for a response back from them? This project does what all good technology does -- it removes the human from the equation. Well... almost! This website will allow you to obtain an instant estimate by providing a few basic measurments. WBS Coatings, one of the leading paint contractors between Denver and Salt Lake City, and also a local business ,specializes in giving your house, office building, garage, or commercial project a new look. Working in conjunction with WBS Coating, the presenters have created a website and easy-to-use project estimator. Getting your painting project priced has never been easier!

Presenter(s)-Major: **Kelly Regimbal - Mathematics**
Title: ANTI-ALIASING SEISMIC IMAGES
Department: Computer Science, Mathematics & Statistics
Sponsor: Daniel Schultz-Ela

Abstract: Seismic processing helps to decipher the mystery of what lies beneath the Earth's surface. Essentially, seismic processing is used to collect information about the Earth's interior to determine images of the subsurface. The Fourier transform plays a major role in the processing steps. This transform converts the acquired data from the time domain to the frequency domain, also known as the Fourier domain, where complex operations can remove aliases, or noise, from the data. While in the Fourier domain, interpolation operations are used to rearrange the data. This change, however, results in a loss of data, which produces aliasing. The presenter will derive a Fourier transform that will incorporate anti-aliasing methods to separate signal from noise.

Presenter(s)-Major: **Elizabeth Reimer - Mathematics, Secondary Cert**
Title: MATHEMATICAL FOUNDATIONS OF EARLY CHILDHOOD COUNTING
Department: Computer Science, Mathematics & Statistics
Sponsor: Edward Bonan-Hamada

Abstract: Very young children are often first introduced to mathematics through the counting of objects. However, what logical structures and procedural entities give rise to the ability to count? If we can count what else can we do? A mathematically-based procedure will be created as a model for early childhood counting. This investigation will consider how to extend this model to the observed phenomena of conservation and addition.

Presenter(s)-Major: **Richard Root - Geology**
Title: EDIACARAN TAPHONOMY: EVIDENCE FOR POSSIBLE RIGID SKELETAL STRUCTURE
Department: Physical & Environmental Sciences
Sponsor: Andres Aslan

Abstract: The Ediacaran biota are discoid, tubular and frond-shaped organisms which lived during the Ediacaran ranging from 635 Ma to 542 Ma. Impressions in substrate created by biological activity represent all of the fossils found in this time period. Ediacaran fossils have been found throughout the world and represent one of the first multi-cellular organisms. The study and interpretation of Ediacaran fossils has been a controversial topic, and has been heavily debated for many years. Since the first studies were conducted many scientists have made assumptions about these organisms based on what is currently understood about the fossil record. The fossil record shows the first organisms with "hard parts" emerged towards the end of the Proterazoic. Evidence shows that impressions made by these organisms have sharp angular features, and consist of radiating, nearly uniform pedals or segments. This suggests that harder, calcified exoskeletons are not out of the question. To address this, an investigation into the taphonomy of these fossils is being conducted. Impressions of hard and soft specimens are being formed using different substrates. The impressions will be photographed, then analyzed and compared to Ediacaran photos to assess the possibility of Ediacarans having a rigid rather than soft skeletal structure.

Presenter(s)-Major: **Molly Roth - Business Admin-Finance**
Title: E-BOOKS: THE FUTURE FOR ALL BOOKS?
Department: Business
Sponsor: Donald Carpenter

Abstract: With the rapidly advancing and acceptance of technology in today's society, the format and production of reading material has changed drastically and has led to the question: is the e-format superior to print? This presentation examines the rising trend of electronic books. It addresses the rising question of converting all print to e-book format by discussing three arguments for complete conversion to e-book format and three arguments against.

Presenter(s)-Major: **Molly Roth - Business Administration-Finance**
Title: SOLVING PROBLEMS WITH EXCEL - PATRIOT PROPANE SYSTEMS
Department: Business
Sponsor: Matt Rosenberg

Abstract: This project was done at the request of Patriot Propane Systems -- an emerging small business that offers alternative fuel systems for vehicles with two products: one system for gas-fueled vehicles and one for diesel vehicles. This business was in need of a means to quickly project and record the results of installing both the systems by gathering information from current and potential customers. The Excel workbook created by the student not only fulfills the need to record data and project results, but also provides forms that can be given to both current and potential customers. As a result, the needs of the Patriot Propane Systems are met and the company can better serve its customers.

Presenter(s)-Major: **Hannah Schaeffer - Mathematics-Statistics**
Title: OPTIMIZING PLOW ROUTES
Department: Computer Science, Mathematics & Statistics
Sponsor: Richard Ott

Abstract: The first action many people take before going on a road trip is finding the "best" route. By "best" route, we often mean the "shortest" to save on gas and time. Graph theory is a field of mathematics that can be used to address this type of problem. In this project, Eulerian cycles and Hamiltonian circuits will be used to investigate plow routes here in Grand Junction. Several factors, including "priority level roads," will be used to determine the optimal plow route. The results will be compared with the plow route currently used.

Presenter(s)-Major: **Max Schultz - Geology**
Title: COLORADO RIVER TERRACE GRAVELS AT THE BIG HOLE RINCON IN WESTWATER CANYON, UTAH, AND CONSTRAINTS ON THE TIMING OF WESTWATER CANYON INCISION
Department: Physical & Environmental Sciences
Sponsor: Andres Aslan
External Funding: National Science Foundation

Abstract: Big Hole is a spectacular entrenched meander of the Colorado River in Westwater Canyon. Comparisons between compositions of Big Hole and modern river gravels as well as regional age estimates, constrain the age of these deposits and the timing of incision of Westwater Canyon. Colorado River gravels are present at two levels: 100-105 m and 190-192 m. Comparisons between Big Hole and modern Colorado River gravel compositions suggest that both gravel deposits represent the combined Colorado-Gunnison Rivers: all Big Hole gravels have abundant intermediate volcanic clasts of the Gunnison River. Cosmogenic ages indicate that the maximum age for Unaweep Canyon abandonment is 1.46 +/- .33 Ma (Balco et al., 2012). This age estimate represents a maximum age for the 190 m Big Hole gravels. Big Hole gravel compositions and age constraints on the abandonment of Unaweep Canyon indicate that Westwater Canyon was carved in <1.4 My. The maximum age estimate (~1.4 Ma) and the height of the 190 m gravels, produces a long-term incision rate of 136 m/Ma. Incision rates calculated using a maximum age of 1.4 Ma for the Big Hole gravels are remarkably similar to longer-term regional incision rates measured over the past 10 Ma. This similarity suggests that Neogene uplift represents a greater control on Colorado River incision than climate fluctuations.

Presenter(s)-Major: **Jasper Shotts - Chemistry**
Title: INSTRUMENTATION TO STUDY OZONE CHEMISTRY
Department: Physical & Environmental Sciences
Sponsor: James Ayers

Abstract: This project attempted to address the oxidation mechanism(s) of chlorine and bromine containing compounds as well as the rates at which they occur; some of these compounds may be carcinogenic and may cause a variety of problems, including thyroid and nervous system ailments. Instrumentation has been constructed so that ozone can be generated in a reproducible manner that is steady and quantifiable, which allows for the study of ozone oxidation chemistry of these compounds. Experiments with this instrument will give insight into the mechanism of oxidation of these compounds and allow measurement of the rate at which these mechanisms occur. Halogen chemistry in the lower atmosphere is not well understood. Data obtained in the lab can be extrapolated to gain an idea of what is going on in the environment and how long these compounds are likely to persist.

Presenter(s)-Major: **Kristin Simms - Nursing, Moriah Surber - Nursing, Kristie Timbreza - Nursing**
Title: REDUCING ERRORS IN HEALTHCARE WITH MULTIDISCIPLINARY COMMUNICATION
Department: Health Sciences
Sponsor: Genell Stites

Abstract: The purpose of this project is to evaluate and improve multidisciplinary communication among team members in healthcare settings. The motivation for this project comes from the presenters' experiences working as nurses and seeing firsthand the negative effects that poor communication has on team members and patient care. Patient care is impacted by many individuals, often including: doctors, surgeons, nurses, nursing assistants, dieticians, respiratory therapists, physical therapists, discharge planners, pharmacists, and others. Studies show that lack of communication, miscommunication, and slow response times of communication between departments can jeopardize patient safety, increase length of hospital stay, and decrease patient satisfaction with their care. Communication problems also lead to decreased job satisfaction among healthcare workers. Studies show that by improving communication between team members, patient concerns and problems were resolved in a more timely manner and nurses noted increased satisfaction with communication and improved patient outcomes. Ineffective communication among team members in healthcare settings is one of the leading causes of medical errors and patient harm. By enhancing communication between departments, there will be fewer medical errors and overall patient care will be improved. All team members involved in patient care can benefit from implementing multidisciplinary communication.

Presenter(s)-Major: **Amie Smith - Pre-Nurse Allied Health, Danielle Vigil - Nursing, Nicole Vorderberg - Nursing, Lauren Wicklund - Pre-Nurse Allied Health**
Title: PATIENT-CENTERED CARE
Department: Health Sciences
Sponsor: Genell Stites

Abstract: Patient-centered care is recognized as a core value in nursing. It is a quality of professional, organizational and personal relationships. It is helping patients be more active in the course of their care and treatment, leading to better patient-centered care. It is also considered the art and science of nursing. Issues involved in patient-centered care, such as electronic health records, can burden patient care because the patients are not getting the one-on-one interaction with doctors and nurses they are accustomed to. Many facilities utilize multiple shifts to accommodate scheduling needs of the unit, as well as of staff. For example, in an 8 hour shift there will be more nurses giving more reports, which increases the chances of important information getting lost or forgotten. In comparison, in a 12 hour shift, there is one report from night to day, alleviating the increased chance of information being left out or forgotten. Utilizing the "seven P's" -- patient, precautions, purpose, plan of care, priorities, procedures/problems, and pain -- will help prevent information becoming lost. This report should be done face to face so that the nurse knows the oncoming nurse gets the information that is needed for the patient. Also, there should be a continuity of the shifts worked; all health care facilities should do either 8 hour shifts or 12 hours shifts for the continuity of care and also for the decreased risk of important patient information being lost. Presenting optimal patient care, remembering the core values of nursing, and recognizing the positive and negative

components of patient-centered care can help improve the outcomes for patients and their families.

Presenter(s)-Major: **Hans Snell - Music-Education**
Title: STAMPEDE!
Department: Music
Sponsor: Darin Kamstra

Abstract: For music education majors, composition is a very useful skill to develop for use in teaching. This presentation will show the developmental process through which "Stampede!" was composed. The basic harmonies of "Stampede!" started out as a Garage Band Project in Music Technology during the fall semester of 2012. The structure is centered on a grounded bass line. Each time this sequence repeats, a new part is added until it reaches a peak. Because of this, "Stampede!" is structured the exact same way as Pachelbel's Canon in D. As the Music Technology class moved on to notation, "Stampede!" began changing into the marching band piece it was meant to be. The drum line begins with a cadence foreshadowing the melody to come, followed by the groove bass line in the low brass. The saxophones have jazzy chromatic passages that go in contrary motion with the bass line. The trumpets, horns, and high woodwinds join later combing the melody in. This all culminates in the halftime section ending the piece in true drum corps fashion. The Maverick Sound is currently performing "Stampede!" at the basketball games this semester.

Presenter(s)-Major: **Patrick Snyder - Mathematics**
Title: GIVEN OUR LIMITED BRAIN POWER, HOW CAN WE LEARN MATHEMATICS?
Department: Computer Science, Mathematics & Statistics
Sponsor: Edward Bonan-Hamada

Abstract: This project is an investigation into how complex mathematics really is based upon a human's ability to construct procedures required to complete a particular type of mathematical task. More specifically, given a formal language and a structure for this language, we will construct a procedure for determining truth, where mathematical truth is defined by the satisfaction relation between sentences of the language and a structure for the language. This requires much more mathematical infrastructure than is apparent and will be demonstrated by the computational complexity of the satisfaction relation with and without a well-ordering of the elements of the structure. An immediate variant of this is to limit the amount of computational storage space allowed to construct these procedures. This variant is thought to mimic human memory limitations.

Presenter(s)-Major: **Thomas Spain - Geology**
Title: LOCATING THE J5
Department: Physical & Environmental Sciences
Sponsor: Sally Potter-McIntyre

Abstract: The middle Jurassic stratigraphic section in western Colorado is composed of the eolian Entrada Sandstone overlain by the Wanakah Formation and Tidwell Member of the Morrison Formation. A major disconformity called the J-5 unconformity is typically assigned between the Wanakah Formation and the Tidwell Member of the Morrison Formation in western Colorado. In Utah, the J-5 unconformity is well established between the Summerville Formation and the Tidwell Member, and previously the Summerville and Wanakah Formations were interpreted to be coeval. However, stratigraphic relationships suggest the boundary between the Wanakah Formation and the Tidwell Member represents a parasequence stacking pattern rather than a major period of non-deposition and/or erosion. The contact between the Entrada Sandstone and the Wanakah Formation is a discrete lithological change, and this contact likely represents the J-5 unconformity. Petrological and field methods, U/Pb age dating of detrital zircons, and stable isotopes are used to compare the Entrada Sandstone, Wanakah Formation, and the Tidwell Member of the Morrison Formation, and to show that the Wanakah Formation is younger than previously thought. These data are used to reinterpret paleogeographical reconstructions of the Colorado Plateau.

Presenter(s)-Major: **Amanda Stahlke - Biological Sciences-Biology, Katharyn Woodard - Biological Sciences-Biology**
Title: MOLECULAR IDENTIFICATION OF DIORHABDA CARINULATA POPULATIONS USING MITOCHONDRIAL CO1 DNA SEQUENCING
Department: Biological Sciences
Sponsor: Zeynep Ozsoy-Bean

Abstract: Tamarisk, (*Tamarix spp.*), or saltcedar, is a deciduous shrub particularly adapted to riparian areas that include the Colorado River in the western United States. It was introduced to North America in the 1800s as a potential solution to erosion control as well as an ornamental plant. However, by the mid-1900s it became clear that the plant lacked natural predators and it quickly outcompeted native plants. Additionally, its prevalence increases the frequency and intensity of fires, drought, and salinity. The tamarisk leaf beetle, *Diorhabda carinulata*, was released first in 2001 in North America as a biological control agent for tamarisk. The original *D. carinulata* population collected in northwestern China, has been extremely successful in defoliating tamarisk in some areas, killing plants and making biological control an outstanding and inexpensive addition to other methods of tamarisk control such as mechanical removal and herbicide treatment. Since the original *D. carinulata* population was not effective everywhere it had been released, *D. carinulata* populations as well as other *Diorhabda* species from across Eurasia are being tested and have been found to be effective in regions where the first beetle releases did not establish. Several *Diorhabda* species and at least two distinct *D. carinulata* populations are now in close proximity or may even co-exist in some areas. Two populations of *Diorhabda*, one originally from Fukang, China and the other from Chilik, Kazakhstan, are now present in Colorado but are impossible to distinguish without molecular (DNA based) tools. Determination of which populations, species or hybrids have been most successful in a given region will allow better geographic matching of beetles with tamarisk infestations. This information could be used to improve the biological control of tamarisk. This study attempts to distinguish between the Fukang and Chilik populations using the DNA sequence of the CO1 mitochondrial region.

Presenter(s)-Major: **Garry Stewart - Physics**
Title: DRIVEN OSCILLATIONS OF A NATURAL MAGNET LEVITATED ABOVE A CERAMIC SUPERCONDUCTOR SAMPLE
Department: Physical & Environmental Sciences
Sponsor: Bill Tiernan

Abstract: A natural magnet that is levitated above a Type II YBCO ceramic superconducting sample has a stable equilibrium of levitation, and will exhibit oscillatory motion when an external force is applied that displaces the magnet from this state. It will be shown that the model provided by the Meissner effect does not allow for this stable equilibrium and subsequent oscillatory behavior. In this experiment, the driven oscillations of the magnet-superconductor system are studied using an apparatus constructed to deliver an AC signal to serve driving force and measure the signal generated by the oscillating magnet in the frequency range between 5 Hz and 25 Hz. Resonance conditions have been observed for both longitudinal and transverse modes of oscillation occurring within this range. The goal of this experiment is to perform a detailed analysis of the resonance conditions that will allow the establishment of important parameters. These parameters will then be used in an attempt to construct a more accurate model of the system. From this model, it is expected that the oscillatory behavior of the system can be predicted at various frequencies.

Presenter(s)-Major: **Robert Tabuchi - Mathematics**
Title: CHAOTIC DYNAMICS IN COMPLEX SYSTEMS
Department: Computer Science, Mathematics & Statistics
Sponsor: Tracii Friedman

Abstract: Using computers, modern mathematicians are able to investigate discrete iterative dynamical systems. In attempts to model real life processes that evolve over time, issues such as the sensitive dependence on initial conditions are encountered. These systems are considered to be chaotic and lead to a lack of confidence in the prediction of long term behavior. This research investigates the behavior of elements in chaotic sets and the stabilization of such elements within a parameter. The study of chaos has been useful in many fields of science such as biology, economics, ecology, and physics.

Presenter(s)-Major: **Denra Taylor - Psychology-Counseling Psych, Kris Trimble - Psychology-Counseling Psych**
Title: TRIANGULATION BETWEEN COLLEGE STUDENTS AND PARENTS IN THE EMPTY NEST
Department: Social & Behavioral Sciences
Sponsor: Susan Becker

Abstract: Triangulation is defined as a conflict arising between two individuals, eventually pulling in a third person to "solve" the conflict. The third person acts as a distracter or sometimes a mediator in the conflict. When marital conflict occurs, one or both parents can include their child in the conflict to distract the parents from focusing on the conflict with each other. The hypothesis is that parents with empty nests will be more involved in their college students' lives. Over-involvement is more likely when there are high levels of conflict and when no siblings are living at home. Survey results will show the relationship between parental conflict and college student stress. Also, results will indicate that the more a student experiences any stress related to independence, the less likely he or she is to become adjusted to college. A questionnaire will be given to students to assess the relationship between them and their parents. A data comparison will be conducted between the sex and age of the participant, whether siblings remain at the home or not, and reported level of conflict in the family of origin's point of view.

Presenter(s)-Major: **Dirk Terpstra - Physics**
Title: LIGHTNING GROWTH: A VISUAL SIMULATION
Department: Physical & Environmental Sciences
Sponsor: Jared Workman

Abstract: Lightning's non-deterministic behavior is an area of study in physics, computer science, and mathematics. These disciplines combine to generate physically based algorithms that simulate the behavior of lightning. Such computer models are created to enhance our understanding of how lightning propagates through space. A physical model is presented that demonstrates the patterns of lightning growth qualitatively. The electrostatics, numerical analysis, and computational methods behind the physical model are explained. Electrostatics is discussed to describe how different potential distributions affect the growth of lightning. To solve these potentials, a partial differential equation algorithm was implemented and tested. A self-avoiding random walk technique is explored to mimic the stochastic nature of lightning's propagation. Using these techniques, a model was created, and the visualization of a series of different, temporally evolving, lighting strikes were made.

Presenter(s)-Major: **Brandon Tompkins - Mathematics**
Title: THE MATHEMATICS OF SOLAR POWER
Department: Computer Science, Mathematics & Statistics
Sponsor: Lisa Driskell

Abstract: It is estimated that Colorado has the potential to produce as much as 83 million megawatt-hours of solar energy per year. According to NOAA National Climatic Data Center, Denver ranks number six among the sunniest major US cities; just below Miami, Florida. Photovoltaic power systems can harness this energy. The mathematical advancements made in the field of PV power systems will be outlined. The complexity of both the Shockley Ideal Diode Equation and the Lambert W-function and their mathematical connections with solar cells will be discussed. A mathematical model of the power output is produced that is dependent on only the environmental conditions and the voltage applied to the system. Unfortunately, the resulting analytical solution involves the Lambert W-function, making it difficult to optimize. However, we will show how the graphs of these complicated solutions can be reproduced with amazing accuracy using natural cubic spline interpolation. This numerical method produces a mathematical model that allows for a much easier first derivation of the optimal (extreme and most productive) operating conditions.

Presenter(s)-Major: **Travis Totcky - Computer Information Systems**
Title: E-COMMERCE AND THE CRITICAL SUCCESS FACTORS
Department: Business
Sponsor: Johnny Snyder

Abstract: The intent of this research paper is to explain electronic commerce and the critical success factors of electronic commerce or E-commerce. This paper intends to

explore multiple aspects of E-commerce and the critical successes found within those various aspects of businesses, such as B2C, B2B, and Mobile commerce or M-commerce. It is also intended to cover the important factors that are weak, neglected, or ignored within their respected areas of E-commerce.

Presenter(s)-Major: **Crystal Turnquist - Business Admin-Entrepreneurship**
Title: DATABASE DESIGN
Department: Business
Sponsor: Gayla Jo Slauson

Abstract: This presentation will demonstrate the results of the activities currently used to create a database to store data and make it useful for queries for an administrator of an internship program. This database has been designed using Microsoft Access.

Presenter(s)-Major: **Roy Varley - Visual Arts Administration**
Title: PRODUCING A MUSIC VIDEO:
AN INTERDISCIPLINARY APPROACH
Department: Art
Sponsor: Steven Bradley

Abstract: Producing a music video requires the collaboration of musical performance, mass communication, and business management. This presentation is a music video featuring the original song, "The Fire." This song deals with the personal growth experienced during college which prepares the individual for the adult world. The music video footage illustrates the story of the song, and was filmed in the community of Grand Junction and at Colorado Mesa University. The presenter drew upon skills and knowledge gained from both core degree curriculum and elective courses, including: Human Resource Management, American History 1800-1950's, Concert Choir, Music Business, and Introduction to Philosophy. Special thanks to mass communication student Kevin Strong-Holte for providing technical assistance.

Presenter(s)-Major: **Zachary Vincent - Chemistry**
Title: ANALYSIS OF ISO-ALPHA ACIDS IN ORDER
TO QUANTIFY BEER BITTERNESS
Department: Physical & Environmental Sciences
Sponsor: Tim D'Andrea

Abstract: An important aspect of analytical chemistry consists of the ability to identify and separate components from one another. This research focuses on isolating iso-alpha acids from beer samples, quantifying them, and identifying the thermal degradation of these compounds. High Pressure Liquid Chromatography (HPLC) and the use of 4-tertbutylphenol as an internal standard were used to quantify the concentrations of iso-alpha acids present in beer samples. The presence of iso-alpha acids contributes significantly to the bitterness of beer and is measured by an International Bittering Unit (IBU), which is a ppm concentration of iso-alpha acids. Currently most breweries are unable to measure IBUs, which results in a rough estimate of bitterness. The presenters worked with local breweries to successfully measure the IBUs of several beer samples.

Presenter(s)-Major: **Katie Walters - English-Literature**
Title: SEX, DRUGS, AND COMICS: EXPLORING THE STEREOTYPES
SURROUNDING YOUNG ADULTS AND COMICS
Department: Languages, Literature & Mass Communication
Sponsor: Robin Calland

Abstract: What constitutes "good" literature is constantly changing. What constitutes literature is evolving as well. Young adult literature is a relatively new, exciting, and ever-expanding genre, encompassing a wide range of personal and social issues. Similarly, the comic form has become increasingly popular in recent years, and covers an almost limitless array of issues and subjects. However, there are many misconceptions concerning the word "comics" as well as the term "young adult." The presenter will expose some of the stereotypes surrounding "comics" and "young adults" as well as draw from critics (Scott McCloud, Carl M. Tomlinson, and others) to show that both comics and young adult literature are much more complex than readers might initially assume, and that comics, as a medium, are perhaps a perfect pairing with young adult literature.

Presenter(s)-Major: **Christopher Wells - Theatre Arts-Acting/Directing**
Title: PASSING STRANGE
Department: Theatre
Sponsor: Jeremy Franklin

Abstract: A performance of a monologue from the critically acclaimed musical *Passing Strange* will highlight the accumulated talents of senior Acting/Directing major Christopher Wells. This project is a key piece of his capstone project and was inspired by the presenter's love of theatre. There is no necessary background information needed for a person to understand this presentation. The only requirement is the ability to hear and the respect to listen. This presentation is meant purely for the enjoyment of presenting a piece that has been analyzed, obsessively rehearsed, and passionately crafted to a willing audience. This project is significant due to its accumulative nature. The culmination of five years of college training have gone into this project, and the only way to use theatrical skills is to present them for all to see.

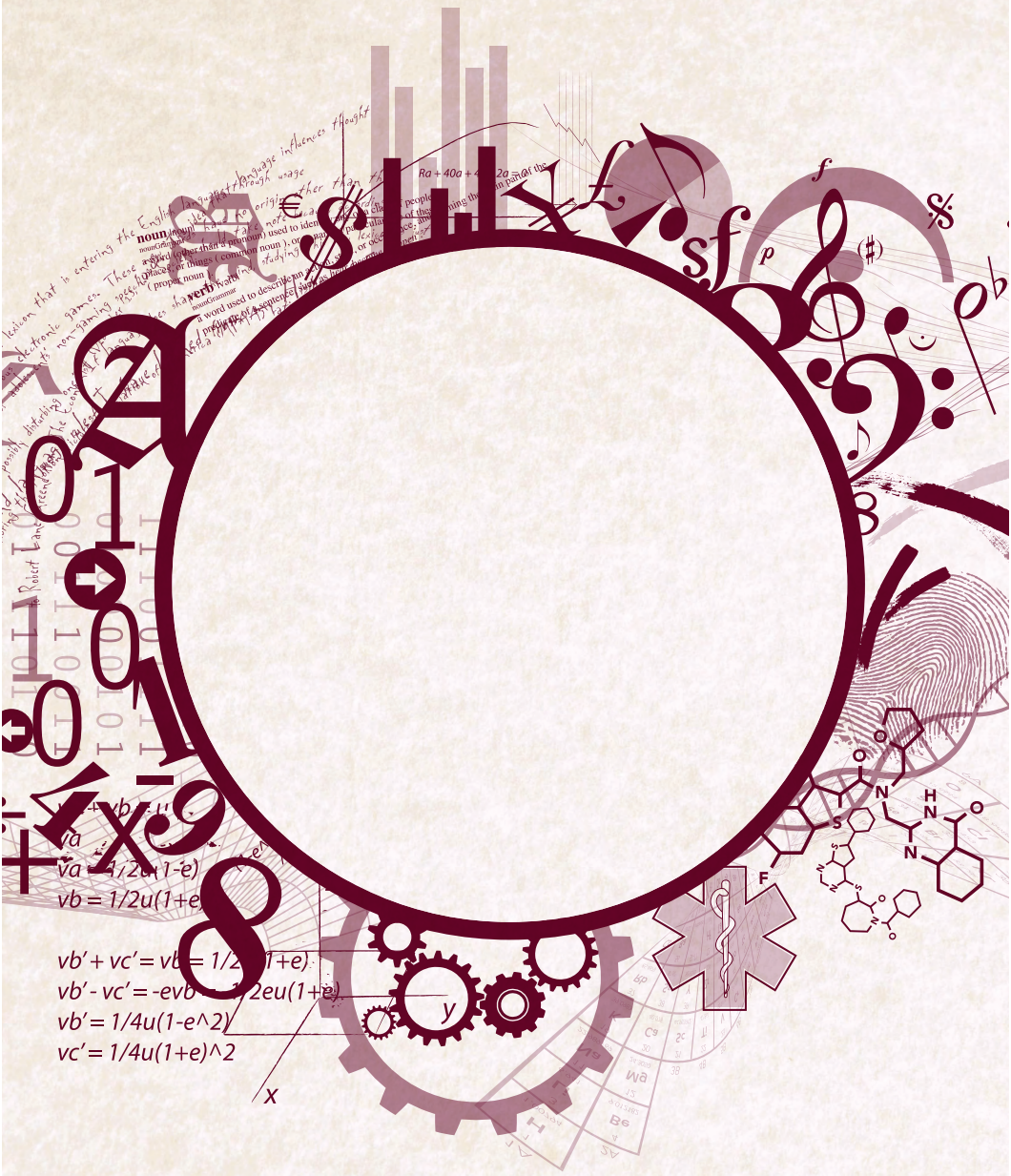
Presenter(s)-Major: **Sarah Wood - Biological Sciences-Biology**
Title: BLACK TEA THEAFLAVINS EFFECTS ON *DICTYOSTELIUM DISCOIDEUM* MOTILITY
Department: Biological Sciences
Sponsor: Kyle McQuade
External Funding: Beta Beta Beta National Biological Honor Society

Abstract: Cellular motility is critically important in processes ranging from the immune response in inflammation to cancer metastasis. *Dictyostelium discoideum* is a unicellular soil amoeba that is commonly used as a model organism to understand cellular motility. Motility has been studied extensively in *Dictyostelium*, and the molecular mechanisms responsible for movement are similar to those seen in mammalian cells, suggesting that *Dictyostelium* is a useful model organism for understanding motility in other systems. Previous research has shown that black tea theaflavins, antioxidants that are believed to have therapeutic properties, effect the *Dictyostelium* life cycle. To further investigate these possible therapeutic properties, the effects of black tea theaflavins on the motility of *Dictyostelium* was studied.

Presenter(s)-Major: **Royce Young - Environmental Science and Tech**
Title: THREE SISTERS TRAIL MAP
Department: Physical & Environmental Sciences
Sponsor: Gigi Richard and Verner Johnson

Abstract: The Three Sisters Property, a 127 acre parcel, located 3 miles southeast of the city of Grand Junction, was once privately owned land that now is part of a conservation easement that belongs to the City of Grand Junction and will be used for outdoor recreation and natural history education. The purpose of this study was to create a map of the trails and historical/educational sites of the Three Sisters Property for the Mesa Land Trust, the Bureau of Land Management (BLM), the Colorado Mountain Bike Trail Association (COPMOBA), and future trail users. Locations of approximately 15 existing trails (both single and double track), 3 proposed trails, and 24 other features that consist of existing signage, interesting cultural and historical sites and trail connections were mapped using a Trimble GeoXT Global Positioning System (GPS) unit and Trimble Terrasync v. 5.30 software. Data were differentially corrected and exported using Trimble Pathfinder Office v. 5.30 software and mapped using ArcMap 10 ESRI software. Three maps were created using the data that were collected, each of which serves a specific purpose. One map shows the extension of an existing trail that was built in Fall 2012, the second shows the double track off-highway vehicles (OHV) trails that can either be used or need to be restored, and the third map shows the proposed trail that connects established trails on the property. Using GPS made it easy to field survey features and to integrate the field data into GIS to create a map of all of the trails and features of the Three Sisters Property quickly and within in a meter accuracy. The data collected will be used for future planning of new trails and restoration of existing trails, as well as planning for educational activities on the site.

COLORADO MESA UNIVERSITY



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